ANIMAL HEALTH DIVISION ANNUAL REPORT 1987

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AGRICULTURE

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ANIMAL HEALTH DIVISION

TERRY L. CHURCH, B.S.A., D.V.M., M.SC.

ACTING DIRECTOR

The goals of the Division were to enhance the profitability of livestock producers and agricultural businesses and help protect animal and human health and well-being. The Animal Health Division provided programs and services which included: a complete range of veterinary laboratory diagnostic services; inspection of livestock and meat; disease investigations on farms; consultation on disease prevention; and transfer of information on diseases of livestock and their management. The purposes of these programs and activities were to assist livestock owners and veterinarians with the recognition of disease problems, to improve disease prevention and control methods, to help ensure the production of safe and high quality food products, and to enforce the legislation assigned to the Division. Diagnostic services were also provided for wildlife and laboratory animals.

The Division was responsible for administration of the Livestock Diseases Act, the Meat Inspection Act, the Fur Farms Act, the Animal Protection Act, and the Veterinary Profession Act. Efforts to update the legislation assigned to the Division were continued. A complete review of the Animal Protection Act was initiated in 1987. The Fur Farm Regulations were revised and forwarded for consideration by Cabinet. The Alberta Veterinary Medical Association requested several amendments to the Veterinary Profession Regulations and these were prepared and proclaimed.

Grants were continued to the Alberta Society for the Prevention of Cruelty to Animals to enable them to employ special constables to investigate problems associated with cruelty, neglect and distress in animals particularly in rural areas. Six special constables located throughout Alberta provided the main enforcement capability for the Animal Protection Act. A grant to provide core operating funds for the Veterinary Infectious Diseases Organization (VIDO) at Saskatoon was continued.

The Summer Veterinary Work Experience Program provided assistance for the employment of 27 veterinary students in veterinary practices at a cost of $43,600. Both veterinary students and practitioners reported that the program was very beneficial and provided valuable work experience.

On October 1, 1987, fees were introduced for the first time for submissions of farm livestock. The fees were $20 per whole animal carcass and $15 for portions and samples. Thanks to the efforts of all staff and a reasonable degree of flexibility during the first six months, there were minimal disruptions and no one was denied service for lack of payment. The overall submission rate for all laboratories appeared to decrease by about 15 to 20%. There were indications that the quality of submissions improved during the initial period.

During 1987, the Division remained structured into five branches to provide services throughout Alberta. However, actions were started to amalgamate the Veterinary Pathology Laboratories Branch at Edmonton, Lethbridge, Airdrie and Fairview into one branch. The Reference Laboratories Branch was located in Edmonton and offered microbiological, histological and toxicological services.

The Health Management Branch provided field services and inspection programs from Edmonton and Airdrie. The Meat Hygiene Branch was headquartered in Edmonton and supported meat inspection services in all six regions of Alberta.

Dr. Terry Church served as the acting director on a developmental assignment beginning April 1, 1987.

SUMMARY OF PROGRAM AND SERVICES

PATHOLOGY BRANCH

The pathology branch was responsible for the provision of diagnostic pathology services to livestock producers and animal owners throughout the province of Alberta. The purpose of this service was to assist animal owners and their veterinarians in establishing the cause of death and production losses in the animals under their care. This service was provided through the professional, technical and support staff located in laboratories at Fairview, Edmonton, Airdrie and Lethbridge. In addition to providing laboratory diagnostic services, the branch served as a consulting and referral agency on matters of animal disease and its prevention and provided an applied research and investigation program. Clientele of the branch included, but was not restricted to, livestock owners, the veterinary profession, fish and wildlife agencies, zoos, the universities, private research agencies and game farms. Information obtained from the diagnostic program and research activities was transferred back to client groups.

The total submission load for the year was as follows: Edmonton - 10,150, Fairview - 1,306, Lethbridge - 2,463, and Airdrie - 3,180. There was a decrease in submissions at the Fairview, Airdrie and Lethbridge laboratories.

The most significant change in the diagnostic program this year was the introduction of user fees for all submissions on October 1, 1987. This change was well received by our clientele and there were very few complaints. It appears to be generally accepted within the farming community, at least, that a user fee is appropriate for the type of service that we provide.

The consultation program naturally follows from the diagnostic program and was continued in all laboratories. Changes during 1987 in this program were minimal. An increased role for staff at the Fairview laboratory in extension and disease investigation in the Peace River area was defined. As part of the consultation program the preparedness of the branch in responding to various emergencies was assessed. The branch participated in further development of the plan for government response to a category 2 sour gas well emission. Staff of the Fairview and Aidrie laboratories continued to be involved with the instruction of animal health technicians from Fairview College and Olds College respectively.

The research and field investigation program of the branch continued to be quite active, and involved many of professional staff in studies of losses in production animals. Particularly prominent were the ongoing studies of losses due to parasitism in this province. A number of studies were undertaken in cooperation with the Fish and Wildlife Division and also in support of the provincial fur farming industry. Support was also provided for research projects at the universities of Alberta and Calgary.

REFERENCE LABORATORIES BRANCH

Laboratory support services for diagnostic, research and disease surveillance for Alberta livestock producers, veterinary practitioners, division veterinarians, other institutions and the rural and urban public were the major responsibilities of the branch. Specialized services were provided in bacteriology, toxicology, virology-serology, and electron microscopy-histology.

A computerized, automated microbial identification system, to characterize disease-causing organisms more accurately and rapidly than manual procedures, was implemented in bacteriology. It also provides antibiotic minimum inhibitory concentrations on pathogenic organisms automatically with a printed report. A practical, cost-effective regime was adopted, in co-operation with federal and private laboratories, to effectively handle Leptospira sp. diagnostic requests and maintain service to the Alberta Swine Breeding Centre.

An array of analytical chemistry analyses was established in toxicology to measure serum vitamins A and E automatically and to measure a wide range of feed additives that can be toxic or produce residues when inappropriately or inaccurately included in animal feeds. A protocol for detecting 'slow acting' blue-green algae toxin was implemented to handle the potentially catastrophic cattle die-offs from contaminated water consumption.

A study of the computer records, in electron microscopy, of bovine neonatal diarrhea fecal examinations in 1987 revealed ambiguous interpretation of viral findings. A major project to examine the ultrastructure of the diseased gut was initiated for 1988 which resulted in changes to the submission pattern for calf scours. The histology lab continued to develop immunoperoxidase techniques to allow specific and permanent identification of pathogens from histology slides.

Employment of additional immunofluorescent techniques further streamlined the virological detection service in the virology-serology section. Chlamydia isolation was changed over to tissue culture from fertile eggs, greatly reducing reporting time and costs.

The Western equine encephalitis virus survey of mosquitoes was not conducted for the 1987 season due to constraints in the Pesticide Chemicals Branch of Environment and the low potential for virus recovery. Carriers of bovine virus diarrhea virus (BVDV), which can cause acute deaths as well as chronic debilitation, were identified through the ability to differentiate between cytopathic and non-cytopathic BVDV strains in the laboratory. Infectious pancreatic necrosis virus infection was confirmed in lake trout, notably a first from reproductive fluids, resulting in eradication of large numbers of lake trout fry and rainbow trout fingerlings in the Cold Lake Hatchery. The prevalence of bacterial kidney disease at Alberta

government trout facilities was reduced via an antibiotic treatment program guided by the fish microbiologist.

Several serology projects were completed during the year. Most significant was the establishment of the sensitivity and specificity of the Actinobacillus (Hemophilus) pleuropneumoniae/ELISA test which allowed it to be utilized in the detection of infection by this pneumonia-producing bacterium in Alberta swine production units. A test to detect maternal colostral antibody transfer in synovial fluid from calves was found to be simple, rapid and accurate and will be a useful indicator of calf survivability in herds.

Major renovations of most laboratories in 1987 caused difficult working conditions and disrupting moves for branch staff who persevered extremely well with minimal interruptions in service. There were also several management personnel changes in 1987-88 with alternations in diagnostic accounting and implementation of unit value systems. Previous specimen counts are not comparable with the new system, but a total case submission number for the branch is estimated at 27,075 for the 1987-88 fiscal year.

BACTERIOLOGY SECTION

In April, 1987, Dr. Pantekoek left for Ottawa to become director of research with Agriculture Canada. Drs. Beck, Armstrong, and Papp-Vid were in charge of this section on a rotational basis.

The lab processed 16,713 specimens for culture and identification of disease-causing organisms. For a large proportion of isolates, the antibiotic sensitivity was determined. Specimens are submitted by veterinary practitioners, veterinary pathologists, producers, and institutions. We participate in monitoring Salmonella spp. in the Poultry Health Program. We continue to evaluate and update our diagnostic protocols.

Bacteria identification is based on cultural, morphological, and biochemical characteristics with the assistance of an automated identification system (Vitek), direct and indirect fluorescent antibody test (FAT and IFAT), tube and slide agglutination.

Antibiotic sensitivity is determined by the Vitek employing minimal inhibitory concentration and the use of Kirby-Bauer discs.

Pasteurella haemolytica Isolation from Nasal Swabs

In co-operation with a practitioner, nasal swabs were taken from 51 yearlings upon arrival at the feedlot. They were sampled from the

nasal pharynx using a Teigland swab. Sampling occurred on three occasions over a seven-day period. During this time, these calves did not receive antibiotics nor developed pneumonia.

Pasteurella haemolytica was isolated on one occasion from three yearlings and on three occasions from one yearling. Pasteurella multocida was isolated on 17 occasions from yearlings.

The six isolates of P. haemolytica were biochemically identified as biotype A. All isolates were sensitive to erythromycin, gentamicin, and spectinomycin. Five out of six were sensitive to trimethoprim/sulfa and all were resistant to tetracycline, penicillin, streptomycin, and triple sulfa S.

Pasteurella haemolytica, biotype T

Pasteurella haemolytica, biotype T (non-hemolytic variety) was isolated from the lungs of bighorn and stone sheep, derived from a zoo. These isolates were identified based on recognized fermentative activity. A comprehensive summary has been prepared describing the cultural, morphological, biochemical characteristics of 60 P. haemolytica, biotype T isolates (non-hemolytic). These isolates were recovered from 38 bighorn sheep, 1982-87. This information is part of a paper in preparation by Dr. Onderka. During 1987, we provided bacteriological support with transmission studies for Pasteurella spp. in domestic and bighorn sheep.

Actinobacillus pleuropneumoniae

Thirty-two isolates, which had been cultured from affected porcine lungs, were serotyped by IFAT. Serotypes 3, 5, and 7 accounted for 93 per cent of all isolates. Serotype 1 and 2 were identified on one occasion. Serotypes 4 and 6 were not identified.

TOXICOLOGY SECTION

Introduction:

The veterinary toxicology laboratory provides services of analytic chemistry to diagnose disease in animals caused by poisons and chemical substances. It also analyzes body tissues for minerals and vitamins, performs clinical chemistry for enzymes and metabolites, conducts tests for environmental toxicology relating to farm animals, and conducts chemical analysis on farm water supply. It conducts and participates in projects and investigational research initiated within the laboratory, the Animal Health Division, other government departments, universities or by veterinarians, farmers, or farm organizations. The purpose of the laboratory is to provide analytic chemistry to diagnose animal disease and assist in food animal production.

The laboratory endured a major disruption of its services due to building renovations, which were completed in February, 1987. The renovations have resulted in a more organized laboratory and created pleasant surroundings.

Major Achievements:

Methods Development

1. Vitamins A and E

Vitamin A and E was established as a routine analysis on serum.

Vitamin A and E can be analyzed by a single injection into a liquid chromatograph using an autosampler to permit a large number of analyses relative to technician time.

2. Algae Toxins

Blue-green algae cause poisoning of livestock drinking from sloughs and small lakes during the summer. The laboratory had previously devised a rapid method of detecting the very-fast-death-factor, an alkaloid named anatoxin. This year a technique was developed to identify the slow acting toxin, a polypeptide named Microcystin A, which causes liver disease.

3. Dicumarol

Dicumarol is an anti-clotting agent caused by fungal growth in spoiled feed, particularly in sweet clover. It is responsible for a hemorrhagic disease and abortions in cattle. An HPLC method has been devised sufficiently sensitive to detect very minute traces in blood accurately. This permits confirmation for an otherwise difficult diagnosis in adults and aborted feti.

4. Feed Additives

A common source of poisoning in livestock results from inappropriate, toxic, or accidental inclusion of commonly used feed additives. A commitment of this laboratory is to develop the most complete range of techniques possible to identify feed additives. Of the 52 feed addi-

tives listed in the AOAC manual, we can reasonably be expected to identify 29 of these. Developed this year are the techniques for monensin, lasalocid, salinomycin, nitrofurazone, furazolidone, nitrofuran, with work performed on carbadox and nicarbazin. Roxarsone and dimetridazole are next on the list for development. Capability for the ionophores is unique in that no other provincial laboratory can do this.

Projects:

1. Ralgro Implant Absorption

Over the past year, the laboratory has determined the amount of zearalenol remaining after implantation with Ralgro, a synthetic hormone growth promoter. The amount of zearalenol remaining at the implantation site was determined in animals implanted at varying time intervals. It was found that Ralgro implants are absorbed from the ear at a slower rate than earlier literature would suggest. Instructions for the use of Ralgro supplied by the manufacturers in Canada state the implant is to be placed in the ear between the cartilage and the skin. Recommendations by the supplier in the USA and New Zealand are to implant at the base of the ear in adipose or muscle tissue where quicker absorption occurs. License for this product and withdrawal times are based on absorption time and possible residues in tissues. The project will continue in order to process sufficient numbers to gain reliable data. Findings could influence

usage of a common livestock production drug.

2. Coronavirus Calf Scours

The identification of coronavirus associated with calf diarrhea is by electron microscopy or immunologic methods. These methods may be time-consuming, expensive and cumbersome. The toxicology laboratory attempted to determine coronavirus presence in calf feces by immunologic methods using a centrifugal autoanalyzer (IL Multistat-III) in order to speed examination time and to increase the number of samples handled. The technique was unsuccessful due to the low virus titer present in feces producing a minimal antigen-antibody reaction, which could not be detected by the instrument.

3. Drugs in Horse Urine

The toxicology laboratory agreed to do a complete toxicologic analysis on any horse which dies at the race track and is submitted for post mortem examination. To meet this commitment, a project of collecting horse urines at local stables and developing the methodology of extracting drug residues from these urines was completed this summer. The urines from these stables provided samples as known negative controls and those treated with certain medicaments.

4. Metabolic Profiles of Dairy Cattle

Serum enzymes used to evaluate clinical health of animals has been used to determine health of dairy cattle as well as diagnosing their

production potential or limitations. This has met with limited success as a herd health tool. Recently, it would appear a more refined analysis of data by multivariant logistic regression may give information on factors limiting health, reproduction and milk production. In co-operation with the Health Management Branch, representative serum samples have been obtained from three herds, including a normal control herd, and 26 parameters performed on each serum. The data will be analyzed by computer during the next year and significance determined.

Discoveries:

1. Seed Treatment Toxicosis

Poisoning caused by eating treated seed was the second most common poisoning in domestic livestock, following lead poisoning. Poisoning has resulted principally from the consumption of rape seed, which had been treated and then cleaned from the seed drill and left laying around the farm where cattle could have access. Poisoning also occurred from improperly stored treated rape seed in which animals gained entry to granaries, sheds or bags. The two toxic products associated with seed treatments are carbofuran, which is a carbamate, and lindane, which is an organochlorine. Carbofuran is found almost exclusively in rape seed and lindane, marketed as Vitavax, is found not only in rape seed, but also in other seed grains, such as barley and oats. There were 25 examinations made for carbamates and approxi-

mately half of these were positive and were associated with either singular or multiple deaths on a farm. Nine cases of Vitavax or lindane poisoning were diagnosed. Again, this was associated with multiple death or, on occasion, a single animal. Additional to the death and sickness loss associated with poisoning from lindane is the contamination of milk due to the excretion of this organo-chlorine. In dairy cattle this has resulted in considerable loss of milk. Milk must be monitored and discarded if the butterfat exceeds 0.1 ppm lindane. One of the major causes of poisoning from these products appears to be farmer unawareness of the toxic potential of seed treatments. The majority of farm chemicals, such as herbicides and sprays and seed treatments, have a very low mammalian toxicity. Seemingly, because of familiarity and association with relatively safe products, livestock producers are not aware of the high toxicity of carbamates and lindane used as insecticides in seed treatments. This has engendered careless ness on the part of farmers and consequently, the incidence of livestock poisoning. One unique experience occurred in pigs, where the livestock producer spread grain treated with carbamates around the barn in order to effect rodent control. The pigs in the barn eventually gained access to this material and poisoning resulted. Also of interest is the occurrence of carbamate poisoning in dogs from consuming these seed treatments. In most instances, the poisoning was accidental. However, on several occasions, malicious poisoning was also suspected.

2. Ionophore Contaminated Feed

With the development of monensin testing in the laboratory, several complaints were investigated of feed refusal and symptomatology associated with introduction of new bags of dog food. The analysis of these foods revealed the presence of monensin on three occasions and could be traced back to small feed mills manufacturing dog food as a side product of their principal activity. It is suspected the contamination was caused by monensin added to cattle or poultry feed settling out in the machinery and subsequently being removed by a batch of dog food run through later. There is considerable difference in species susceptibility to monensin with horses and dogs being particularly sensitive. Symptomatology of poisoning in dogs are feed refusal and incoordination and slobbering.

3. Vitamin E Deficiency

Results from Vitamin E analysis from our newly developed Vitamin A and E technology, has revealed a considerable number of animals deficient in Vitamin E. This appears to be a more prominent feature in animals during the late winter and early spring months, resulting from use of stored feed. It is interesting to note the common perception in livestock husbandry in Alberta, is that Vitamin A deficiency is a constant problem and that recommendations are made consistently to supplement Vitamin A in the diet. From our analysis, Vitamin A rarely appears to be deficient and has only been noted in very young animals, such as housed dairy calves or very young veal calves, showing signs of

malnutrition and a very rough hair coat. However, in contrast, approximately 5 to 10 per cent of the animals tested for Vitamin E had evidence of very low levels, some of which could be considered overtly deficient. This occurred in a variety of classes and ages of animals. Vitamin E has been reported necessary for disease resistance, normal productivity and reproduction, as well as protection against selenium deficiency diseases and muscle disease. The discovery of low levels of Vitamin E in Alberta cattle should prompt a reconsideration of the emphasis placed on a vitamin supplementation that Vitamin E as well as Vitamin A be included in the diet.

Summary of Services:

The following analytic services are available from this laboratory:

1. Atomic absorption spectrophotometry - used for measuring inorganic substances especially metals.
2. Graphite furnace AA analysis - for selenium and lead.
3. Gas chromatography
4. Liquid chromatography - high pressure and thin layer.
5. Mass spectroscopy combined with a GC and a purge-trap instrument permits a wide molecular range and the detection of low molecular weight organics.
6. Ion chromatography - to detect such problems as fertilizer poisoning in ruminants and to perform automated analysis of water for chemical suitability.
7. Visible absorption spectrophotometry - to examine blood pigments.

8. Clinical chemistry analyzer - for performing serum enzyme analyses.

9. Mercury vapor detector

A wide range of ancillary laboratory equipment is available permitting complex organic solvent extractions and processing of specimens for a wide spectrum of demands.

Field Investigations:

1. Phomopsin Mycotoxicosis

A field trip to the Buck Lake area was prompted after a three-year monitoring program revealed very low levels of serum selenium in a herd, which had been supplemented with dietary selenium free choice in salt. The problem of low selenium levels in supplemented cattle has not been an uncommon phenomenon noted in Alberta cattle. Occasionally, the complaint is raised about a local gas plant and the probability of environmental pollution inducing selenium deficiency. In this investigation a novel approach was pursued in that recent literature demonstrated the presence of a mycotoxin produced by the fungus Phomopsis, which has the capability of inducing excessive selenium excretion in sheep. This fungus grows predominantly on lupines, and sheep are commonly pastured in the fall in Australia on lupine stubble. White Muscle Disease can be produced on these pastures as well as a more chronic sub-clinical liver cirrhosis. Because lupines commonly grow in pastures in the Alberta foothills, as

determined by analysis performed on rumen contents in the toxicology laboratory, a field investigation was designed to explore the possibility of this Phomopsis leptostromiformis organism being present on pastures. This fungus was thought to be confined only to Australia, however, recently it has been identified in Texas. A field investigation was conducted and samples of plants were submitted to the Alberta Environmental Centre in Vegreville, where Dr. Karbanda agreed to do the mycotic culture and identification. The culture and identification of the organism is still continuing with samples being sent to an international reference centre. In the meantime, analysis of the three year selenium data on the farm would suggest an interfering substance is not a likely cause of deficiency. The difficulty of consistently administering selenium as a free choice salt may be a more probable cause. Further research in this area would well be directed towards means of administer-ing selenium to herds, as well as fertilizing pastures with selenium enriched fertilizer.

2. Elevated Zinc in Veal Calf Livers

Monitoring by Canada Agriculture for elevated heavy metals and drug residues in animal tissues from packing houses revealed the presence of elevated zinc levels in the liver of veal calves. An investigation was made into the cause for elevated zinc in co-operation with Dr. Schoonderwoerd of the Pathology Branch. Coincidental with this investigation was a complaint from one producer of not only high levels of zinc, but also high levels of copper in the liver along with

unexplained deaths and ill health in the veal barn. The producer associated this ill health with the operation of an overhead gas heater. Investigation revealed the cause of elevated zinc in the liver to be associated with a particular brand of milk replacer in which high levels of zinc had been added. This was confirmed by matching this feed with elevated levels of zinc in other producers' calves. Additionally, the carbon monoxide levels in the barn were tested and 20 ppm of carbon monoxide could be identified from the heater when the extractor fans for the rest of the building were turned on. It is hypothesized that the flow of air created an oxygen starvation problem to the flame resulting in incomplete combustion and, therefore, the production of carbon monoxide fumes. Several tissues were examined from calves, but no lesions could be found to confirm the presence of carbon monoxide poisoning. It was presumed that carbon monoxide poisoning did exist, however, the calves suffering this condition had been sent to slaughter some months before. The feed companies have been approached on reformulating their feed, which appears to have been successful.

3. Preparturient Paresis in Beef Cattle

A problem of cows going down with symptoms of milk fever one month before calving was identified by a beef cow-calf operator. Investigation suggested the problem was an excess of calcium present in the diet close to calving time. It was recommended the normal level of calcium in the diet should be reduced six to eight weeks prior to

calving in order to stimulate the parathyroid gland to produce sufficient parathormone to mobilize calcium from the bones during lactation at calving.

List of Publications:

Papers actually published:

1. A Rapid Analysis of Water for Anatoxin A, The Unstable Toxic Alkaloid from Anabaena Flos-Aquae, the Stable Non-Toxic Alkaloids Left After Bioreduction and a Related Amine Which May Be Nature's Precursor to Anatoxin A. RA Smith and D Lewis. Vet Hum. Toxicol. 29, 153-154, 1987.
2. Fanweed Toxicosis in Cattle: Case History, Analytical Method, Suggested Treatment, and Fanweed Detoxification. RA Smith & SP Crowe. Vet Hum. Toxicol. 29, 155-156, 1987.
3. Cicuta Toxicosis in Cattle: Case History and Simplified Analytical Method. RA Smith & D. Lewis. Vet. Hum. Toxicol. 29, 240-241, 1987.
4. The Determination of Volatile Carbonyl Compounds in Diagnostic Samples. RA Smith. Vet. Hum. Toxicol. 29, 244-245, 1987.
5. Suicide by Ingestion of 2,4-D, A Case History Demonstrating the Prudence of Using GC/MS as an Investigative Rather Confirmatory Tool. RA Smith & D Lewis. Vet. Hum. Toxicol. 29, 259-261, 1987.
6. Potential Edible Lupine Poisonings in Humans. RA Smith. Vet Hum. Toxicol. 29, 440-441, 1987.

Letters to the Editor:

Roquefortine in Dead Dogs. Vet Hum. Toxicol. 29, 322, 1987.

Agri News:

Be Alert to Feed Additive Hazards. RA Smith.

Treated Seed Grain is Dangerous. RA Smith. (In preparation for 1988)

Toxic Algae in Alberta. RA Smith. (In preparation for 1988)

Oral Presentations:

AOAC Fargo North Dakota. June 15-17, 1987.

Veterinary Toxicology Section

1. The Three Princes of Serendip (with apologies to Horace Walpole). RA Smith.
2. The Potential Role of Ion Chromatography in a Veterinary Toxicology Laboratory. C. Maxwell and RA Smith.

Immunoassays Section

3. Immunoassays in Veterinary Medicine. EJ Christie and RA Smith.

Papers in Print

Stinkweed Poisoning in Cattle. SP Crowe, RA Smith, RA Fenton and EE Hall (accepted by Can. Vet J.).

Papers in Advanced Stages of Preparation

Cyanide Levels in the Body Fluids of Coyotes Killed by Coyote Getters. RA Smith & BE Beck.

The Rate of Absorption of Growth Promoter Implants from the Injection Site in Bovine Ears: A Re-investigation. RA Smith, BE Beck, EJ Christie and D. Lewis.

Monensin Toxicity in the Dog. RA Smith, BE Beck, EJ Christie, D Lewis, GA Chalmers and several others.

Suicide by Ingestion of T61, a Product for Veterinary Euthanasia. RA Smith & D. Lewis.

Accidental Death of a Child by Ingestion of Sodium Fluoride. RA Smith.

Accidental Death by Intentional Inhalation of Gasoline Vapours. RA Smith.

A Potpourri of Pesticide Poisonings in Alberta in 1987. RA Smith and D. Lewis.

Interesting Cases:

1. Roquefortine

Roquefortine was identified in dogs' stomachs. Roquefortine is a product of fungal growth present in blue cheese. The significance of this product is unknown, but its presence in a dog's stomach on several occasions prompts the question of possible poisoning in garbage eating dogs.

2. Linuron

Linuron was identified in a tree nursery. This is a herbicide, which appeared as a contaminant and resulted in many hundreds of thousands of seedlings dying.

3. Picloram (Tordon)

Picloram was identified in sheep that demonstrated the signs of nervous ness with facial paralysis, particularly of the lower jaw and later posterior paresis. They would drink, but not eat. The source of Tordon contamination was watering sheep out of plastic buckets in which Tordon was originally supplied.

4. Strychnine

Strychnine was identified numerous times and is the common cause of malicious and accidental poisoning in dogs. Strychnine used by govern ment pest control officers is identified with a chemical marker. In one instance, the chemical marker was found in two strychnine poisoned

dogs, which initially indicated poisoning of a non-target animal. On investigation, it was proven that the two dogs poisoned were indeed the animals killing sheep, rather than coyotes. It was suspect in another case that a government source of strychnine poisoned a non-target animal. However, no marker was present. Upon further investigation a paraffin wax could be identified in the stomach content and traced back to out- of-date strychnine pellets available previous to the marker being added.

5. Barium Carbonate

Barium carbonate was identified on a piece of meat left in a garden. This is an old remedy rat poison. Its use is unusual, as it has not been a common poison available for the past twenty or thirty years. The occurrence would suggest possible sources of origin.

6. Urea

A herd of cows was poisoned by the accidental overdose of urea by a feed company. The diagnosis was made from the rumen contents by ion chromato-graphy and by analysis for urea.

7. Nitrate Poisoning

Nitrate poisoning was identified in one animal by demonstrating the presence of nitrates in the urine. Urine is the specimen of choice of animal tissues in diagnosing nitrate poisoning. Rumen contents are inappropriate.

8. Barbiturates

Barbiturates are commonly identified in animal tissues as an iatogenic agent. In one instance, dogs were euthanized by barbiturates and submitted to the laboratory. The primary motive was suspected to be a cheap disposal site. Barbiturates were identified in the crop of eagles from B.C. Cause of this poisoning was unknown, but thought to be accidental.

9. Pentachlorophenol

Pentachlorophenol was identified in a horse blood that was known to be chewing on treated wooden fences. No specific symptomatology was associated with this occurrence.

10. Cyanide

Cyanide poisoning was identified in coyotes, which were subject to predation control with the coyote getter guns loaded with potassium cyanide. A marker system was devised for identifying coyotes poisoned with this material and a series of analyses were performed to determine the distribution of cyanide in the body for diagnostic purposes.

11. Chlorodane

Chlorodane was identified in the stomach contents of a dog. The initial suspicion for requesting the examination was a strong smell of aromatic hydrocarbons, which acts as a vehicle for many organochlorine pesticides.

12. Strychnine and Rompun

Strychnine and rompun were identified in injection sites in the muscle of cattle maliciously poisoned. The cause of death was suspect upon finding needle marks on the carcass and the portions of muscle subsequently revealed strychnine injected into one location and rompun into another location. It was thought the rompun was administered prior to the strychnine to prevent the convulsions associated with strychnine from attracting attention.

13. Hydrocarbons

Hydrocarbon poisoning was diagnosed several times during the year, particuarly associated with the oil and gas industry. In one instance, an uncontrolled spray of condensate coated a pasture occupied by horses. In another instance, a flare was extinguished while proving a new well and sprayed a farmstead and purebred shorthorn cattle with a mixture of condensate, crude oil and gas. In the Drayton Valley area, there was a pipeline spill of a very high test crude. Analysis in this case revealed a product very much indistinguishable from gasoline. Cattle were seen to be drinking this material and subsequently, experienced chemical pneumonitis. There was a crude oil spill at Rimbey and several cattle were poisoned. Another spill around a well site involved sodium nitrite and was responsible for the death of nine or ten animals. This is the first time that sodium nitrite has been involved in animal poisonings associated with drilling muds.

14. Thimet

Thimet is an organophosphate, which can be used as a seed treatment and insecticide. Poisoning occurred in cattle with this material.

15. Avitrol

Avitrol, 4-aminopyridine, was identified in corn taken from the crop of pigeons. Avitrol is a commonly used avian control poison set out as a bait to control pigeon populations.

16. Carbon Monoxide

Carbon monoxide poisoning occurred in a cat. This was diagnosed by identifying carboxyhaemoglobin through visible absorption spectro-photometry.

Statistics:

Acetone	2 Pos.	Copper Sulfide	1 Pos.
Additives	1 Neg.	Courmarin	1 Neg.
Aflatoxins	1 Neg.	CPK	1
Alcohol	4	Cyanide	3 Pos. 3 Neg.
Algae	5 neg.	Cyanogenic Glycocides	1 Neg.
Alkaloids	15	Dibutylphthalate	1
Aluminum	1 Pos.	Dicumarol	1 Pos. 8 Neg.
Anatoxin	6 Neg.	Diphenylquanidine	3
Arsenic	3 Pos. 3 Neg.	Dipyrone	1 Pos.
Banamine	1	Drugs and Common Poisons	9
Barbiuturates	1 Pos. 2 Neg.	Drug Screen	1 Neg.
Barium Carbonate	1 Pos.	Electrolytes	54
Benzocaine	1 Pos.	Epinephrine	1 Neg.
Biochem	2025	Ergot	1 Pos. 3 Neg
Bone Ash	5	Ethacrynic Acid	2 Pos.
Bone Marrow	1		
Brucine	1 Pos.	Feed Analysis	1
Calcium	1	Fenthion	1 Neg.
Carbon Monoxide	1	Fertilizer	2 Neg.
Carboxin	3 Pos.	Gaba	1 Pos.
Cicutoxin	1 Pos. 4 Neg.	Glycol	11
C,M,P.	890	GSH	90
Colubrine	1 Neg.	Hepachlor	1 Pos.
Copper	1077	Herbicides	3 Neg.
H_2S	1 Pos.	Pentachlorophenol	1 Pos.

Ionophores	1 Pos. 12 Neg.	Pentobarb	7 Pos.
Ions	2 Neg.	Petroleum Hydrocarbons	
Iron Chromat.	1 Neg.	- crankcase oil	1
Iron Oxide	2	- crude oil	4
Isothiocyanates	2 Neg.	- hydrocarbon	17
Ketamine	1 Neg.	- petroleum wax	1 Pos.
		- oil used	2 Pos.
Lead	101 Pos. 135 Neg.	Pesticides	6 Neg.
Linuron	3	pH	2
Lupines	1 Pos.	Phorate (thimet)	1 Pos.
Manganese	22	Phosphide	1 Neg.
Metaldehyde	1 Pos. 2 Neg.	Picloram	1 Neg.
Methandrostenolone	1	Plants	2
Methemoglobin	1 Neg.	Prednisolone	1
Methyl Ethyl Ketone	1	Primidone	1 Pos.
Monensin	2 Pos. 1 Neg.	Procaine	1 Pos.
Mould (Water Filter)	1	Quality Control (CAPS)	
Mycotoxin	129	Roquefortine	2 Pos.
Nitrates	24	Salinomycin	1 Pos.
Not Examined	23	Seed Treatments	
1080	1 Neg.	- Carbathin	1
Organo Phos.	1 Pos. 4 Neg.	- Carbofuran	22
Oxylates	6	- Carbamate	1 Pos. 1 Neg.
Paraquat	2 Neg.	- Lindane	8 Pos.
		- Vitavax	1 Pos.
Selenium	1319		

Smut	1 Pos.
Sodium	1
Sodium Bichromate	1 Neg.
Sodium Chloride	31
Sodium Sulfate	1
Strychnine	74 Pos. 141 Neg.
Tar Roofing Paint	1
Thiooxazolidone	1 Neg.
Thyanmylal	1
Tinsel	2 Pos.
Toluene	2
Tordon	1 Neg.
2,4-D	1
Urea	5 Pos. 1 Neg.
Urinalysis	1
Urinary Calculi	14
Urinary Stone	1
Uric Acid	3
Vitamin A and E	652
Vomitoxin	1 Pos.
Warfarin	4
Xylazine	1 Pos. 1 Neg.
Xylene	2 Pos.
Zearalenone	1 Pos. 2 Neg.
Zinc	69
Zygadenine	1 Neg.

VIROLOGY-SEROLOGY SECTION AND FISH MICROBIOLOGY

Employees of the section:

Dr. Geza Papp-Vid, Section Head

Emma Barager, Laboratory Scientist II

John Wu, Laboratory Scientist II

Tom Packer, Laboratory Technician IV

Edith Ruzsicska, Laboratory Technician III

Bev Larson, Laboratory Scientist II

The fish microbiologist position belongs to the Department of Forestry, Lands and Wildlife, Fish and Wildlife Division, but the laboratory is a part of the Reference Laboratories Branch. Its operation is supervised by the section head of Virology-Serology and also by Dr. Hanson of the Pathology Branch.

Physical Facilities:

The section is located in the O.S. Longman Building; Virology-Serology on the 6th floor, whereas Fish Microbiology on the 3rd floor. Before the permanent relocation to the 6th floor, the laboratory was temporarily moved to the 7th floor at the beginning of the year where it stayed for about three months, sharing laboratory space with the Wildlife Section. Similarly, Fish Microbiology was also temporarily relocated for four months. Despite the inconvenience of relocating, reporting time was not unduly delayed. Previous to the relocation, Virology occupied a small area in the annex, and Serology shared space with Bacteriology on the 3rd floor.

Objectives of the Section:

The section provides diagnostic services in the field of virology-serology and fish microbiology to pathologists, veterinary practitioners and producers. The services include the detection of viruses by isolation, immunofluorescence (FAT), electron microscopy (EM), and the use of various serological protocols, such as serum neutralization (SN), double immunodiffusion (DID), enzyme linked immunosorbent assay (ELISA), indirect FA (IFAT), for the detection of antibodies to various infectious agents.

In co-operation with other sections and/or branches, the section creates projects and pursues investigations to establish disease status of herds and that of fish in Alberta.

Developmental research is an important responsibility of the section.

Major Achievements:

Infectious Pancreatic Necrosis Virus (IPNV) was isolated from lake trout from Cornwall Lake. For the first time, a significant portion (greater than 20 per cent) of the reproductive fluids tested positive for the virus, thus there was increased concern for vertical transmission and cross-contamination to stocks at Cold Lake Hatchery. As a result of IPNV infection, 900,000 lake trout sac fry and 250,000 rainbow trout fingerlings were destroyed. Confirmation of IPNV was made at Fresh Water Institute, Winnipeg, Manitoba. A major

disinfection of the hatchery was planned and carried out.

Multiple submissions (Perch) from Pine Lake due to fish morbidity and mortalities resulted in isolation of Cytophaga psychrophila from both external and spleen lesions from a large portion of the submissions. External lesions were typical of Peduncle Disease. An Aeromonas hydrophila was implicated as a second agent.

Mycobacterium chelonae was isolated for the third time in this laboratory from fat head minnows, which originated from Lac Sante and had been reared at the Alberta Environment Centre, Vegreville acquatic facility.

Moribund rainbow and brook trout were submitted from Fairfax Lake; these stocks had earlier (1986) been examined as healthy stocks to investigate a longevity problem which had been indicated. At that time, some isolations of Yersinia ruckeri had been found in a carrier state in the intestinal flora. In spring of 1987, trout were submitted with severe fin rot extending into muscle lesions at bases of fins. A dual infection with both Yersinia ruckeri and Aeromonas hydrophila was detected invading through the skin to cause a systemic infection.

Systematic antibiotic treatments of fish, under the guidance of Fish Microbiology, significantly decreased the prevalence of Bacterial

Kidney Disease (BKD) at all Alberta government trout facilities. A private aquarium fish with septicemia yielded a heavy pure growth of Streptococcus uberis.

A large number of calf scour specimens were examined for the presence of rota- and coronaviruses. Many of the submissions did contain one or the other virus, and often both agents were present in the fecal material. It was curious that in a number of cases, even clinically healthy animals, shed virus in their fecals. These experiments were carried out with the Histology and Electron Microscopy Section.

Attempts were made to detect bovine corona- and rotaviruses by immunological methods. At this time, the lack of sensitivity of the instrument used in the procedure failed to provide a reliable technique that would replace the very time-consuming electron microscopy.

The isolation of bovine viral diarrhea virus (BVD) always involves some difficulty. This year, however, the recovery rate of this agent has increased, and its isolation from various tissues was most successful. It is noteworthy of mentioning that cytopathic BVD virus was recovered four times from buffy coat cells. Non-cytopathic BVD virus isolation was also a routine. Although not too many isolations were made in 1987 due to the fact that the number of requests for the identification of BVD carriers was rather small, the capability to

isolate non-cytopathic BVD virus is available.

Equine arteritis virus (EAV) was isolated again from clinical cases and confirmation of the isolations was made by Dr. Timoney at Lexing-ton University, Kentucky. Recovery of this agent from semen was also achieved.

Serum neutralization detected antibodies to EAV in a number of cases.

Aleutian disease survey was conducted, and serology identified a high (85 per cent) prevalence of this agent in certain populations.

Serological surveys to detect antibodies to bovine respiratory syncytial (BRS) and BVD viruses were conducted and the presence of both agents by this method was recognized.

Experiments were carried out in order to adapt ELISA for the detection of antibodies to various viral agents. BRS virus was one of the most important along with BVD virus, for which this new serological method was adapted. The method appeared to work well with BRS virus, whereas there were problems with the specificity as far as BVD virus was concerned.

Immunofluorescence was introduced for the diagnosis of several avian viral diseases, such as IBV, NDV, reovirus and for Chlamydia. The

application of this technique accelerated reporting time significantly, such as from three weeks to 24-48 hours. (Three weeks are necessary for the isolation of some of these agents in embryonating chicken eggs).

McCoy cells were used for the isolation of Chlamydia and found to work well. There was a good correlation between isolation of this organism in eggs and in McCoy cells. The benefit of using cell monolayers as opposed to the isolation of Chlamydia in eggs is the time (48 hours in cell culture, whereas in eggs about three weeks).

Serological diagnosis of BRSV was standardized and improved by the application of Vero cells for antigen preparation.

A slide agglutination test was adapted for the demonstration of maternal antibodies in synovial fluids of calves. The test is simple and rapid and uses latex particles sensitized with antibodies to bovine IgG.

A list of serological tests performed in the laboratory was created. This was done in co-operation with VIDO so that serological tests available in the country are compiled and presented in a list and provided to all diagnostic laboratories as a reference material.

The section contributed to the parentage testing of elk in the

province by providing assistance to Fish and Wildlife. This involved the mobilization of manpower in the whole branch for the preprocessing of blood, including the separation of plasma, red and white blood cells, and their shipping to New Zealand.

Actinobacillus pleuropneumoniae serology was done on an experimental basis using an ELISA kit from VIDO. The tests were carried out on known positive and negative herds of pigs as established by clinical observation and history. A statistical procedure (discriminant analysis) was used for the evaluation of data. It was decided the test will be used on a limited basis for monitoring swine herds.

HISTOLOGY-ELECTRON MICROSCOPY SECTION

Employees:

Dr. Dale Armstrong, Section Head

Gary Higgs, EM Laboratory Scientist II

Marilyn Johnson, Histology Technician IV

David Hansen, Histology Technician III

1987 was eventful for histology-electron microscopy staff even though our clients realized little. In July, the entire lab was moved to the research unit in the annex, including the electron microscope, for nearly four months while the third floor area was renovated. Little disturbance in service was experienced, which is commendable for the staff. The new lab has succeeded in consolidating histology-electron microscopy with improved efficiency, traffic flow and safety.

Histology

January 1, 1987 marked the official institution of unit values for the section. These are based almost exclusively on the Canadian Workload Measurement System from Statistics Canada and Health and Welfare Canada with few values generated by staff. Figure 1 illustrates the relationship of slide numbers to unit values by month for the year in histology.

Animal Health Division changes, such as introduction of charges, may have reduced caseloads somewhat, but histology lab workload has not

been affected significantly. The total numbers of slides produced in 1986 was 18,741 routine plus 1,427 special stains for a total of 20,168 compared to 18,727 plus 1,075 specials for a total of 19,802 in 1987. This represents a two per cent reduction, which is primarily due to reduced special requests.

The number of histology submissions in 1987 was 5,745 distributed as follows: 4,022 (70%) mammals, 742 (12.9%) poultry, and 981 (17.1%) reproduction distributed already in Figure 2.

The 1986 numbers do not relate directly because of the introduction of unit values and, therefore, slightly different "counts" must be utilized. Total cases was 5,075 with the following distribution: 3,250 (64%) mammals, 750 (15%) poultry, 1,075 (21%) reproduction, which roughly parallels 1987.

Immunohistochemistry or immunoperoxidase (IP) combines high specificity with excellent histological resolution in easily transported fixed tissue. Marilyn Johnson supervised summer students, Doug Smith and Michelle Harvey, to develop new applications. Bovine Respiratory Syncytial Virus (BRSV) in bovine lungs, utilizing a monoclonal antibody developed by Dr. G. Anderson from Kansas, showed excellent promise and was tested extensively on new cases through the fall feedlot pneumonia season. Intermediate filament protein identification is used in human medicine for tumor diagnosis. Kits for

desmin, cytokeratin and vimentin were evaluated to aid in neoplasm diagnosis. These may be employed in difficult tumor cases to help determine mesenchymal or epithelial derivation.

Six cases of suspected pemphigus in dogs were studied in 1987 utilizing IP. Intercellular immunoglobulins were demonstrated in four cases.

Three special projects in 1987 were parasitology-related, including serial sections of Taemia mustelae from mink producing 136 slides from six blocks.

A major feedlot project (SP86-13) by Dr. Pierre Daoust was completed in early 1987 by wage employee Pat Layton. Total cases were 69 resulting in 1,480 blocks and slides for total unit values of 8,366. A small trial on differential staining of pancreatic islets cells demonstrated Masson Trichose to be most valuable. A new stain, Glenner/Lillie, proved valuable on differentiating pituitary cells.

Five-hundred eighty-three EM specimens were received totalling 58,542 unit values. The distribution of specimens by month as illustrated in Figure 3 and by procedure in Table 1. Direct negative stained submissions form the majority at over 82 per cent of the total specimens and 72 per cent of these (346) are for bovine neonatal

diarrhea. These bovine neonatal diarrhea specimens form 59.3 per cent of the total specimens for 1987.

The computerization of EM records allows relatively easy lab data analysis, which Gary Higgs has utilized to also provide a distribution of specimens by species in Table 2 and an analysis of porcine transmissible gastroenteritis (TGE) and canine parvovirus cases in Table 3. It is noteworthy that of 47 pigs, 23 were positive for coronavirus and none were confirmed as TGE.

Gary has also done an excellent analysis of the bovine neonatal submissions that is included as a separate report. A most interesting finding is that the majority of calves over three weeks of age was positive for virus suggesting widespread endemic virus infection even though the sample is skewed to clinically affected animals. Two groups of calves from herds with no history of scours were sampled with an infection rate of rota-coronavirus of 65 per cent.

These results have fostered the initiation of a project for 1988 to analyze the pathology of enteric infection in calves. A fixed specimen of gut will be analyzed ultrastructurally and correlated with the direct fecal results. A Farming for the Future grant was applied for to aid the project completion.

A particularly interesting case investigated in 1987 was a congenital

skin disease in a calf. Ultrastructurally the disease closely resembles epidermolysis bullosa in humans. A project is underway to help investigate this malady in beef cattle and as a potential animal model of human disease. It is a co-operative project with the Airdrie lab and Saskatoon and utilizing the services of a PEP employee, Doug Sasaki, in Reference Laboratories Branch, Edmonton.

Other interesting cases involved demonstrating herpesvirus porcine nasal turbinate inclusions confirming Inclusion Body Rhinitis. Another herpesvirus was visualized in tissue culture cells by conventional thin section suggestive of Equine Viral Rhinopneumonitis.

A clear low viscous resin called Spurrs was introduced that penetrates tissues more readily and cures more rapidly with better ultrathin sectioning characteristics. Pretreatment of tissues with tannic acid was evaluated which enters damaged versus undamaged cells creating electron dense deposits.

A key part of renovations was installation of a vibration isolation platform for the electron microscope. The combined weight of over 2,500 lbs. is suspended on an air cushion with no direct mechanical contact with the building to suppress the detrimental effects of vibration.

Figure 1

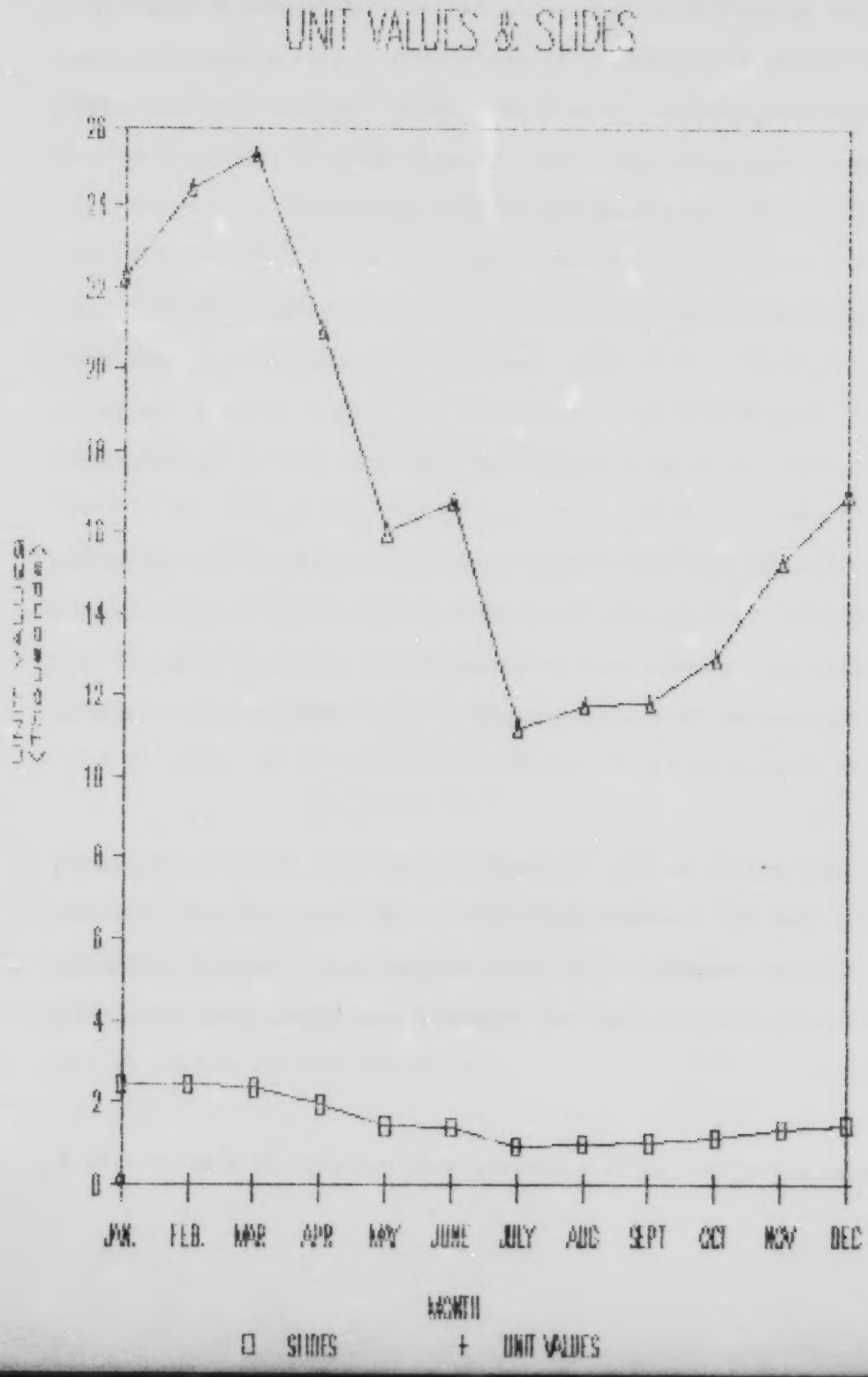
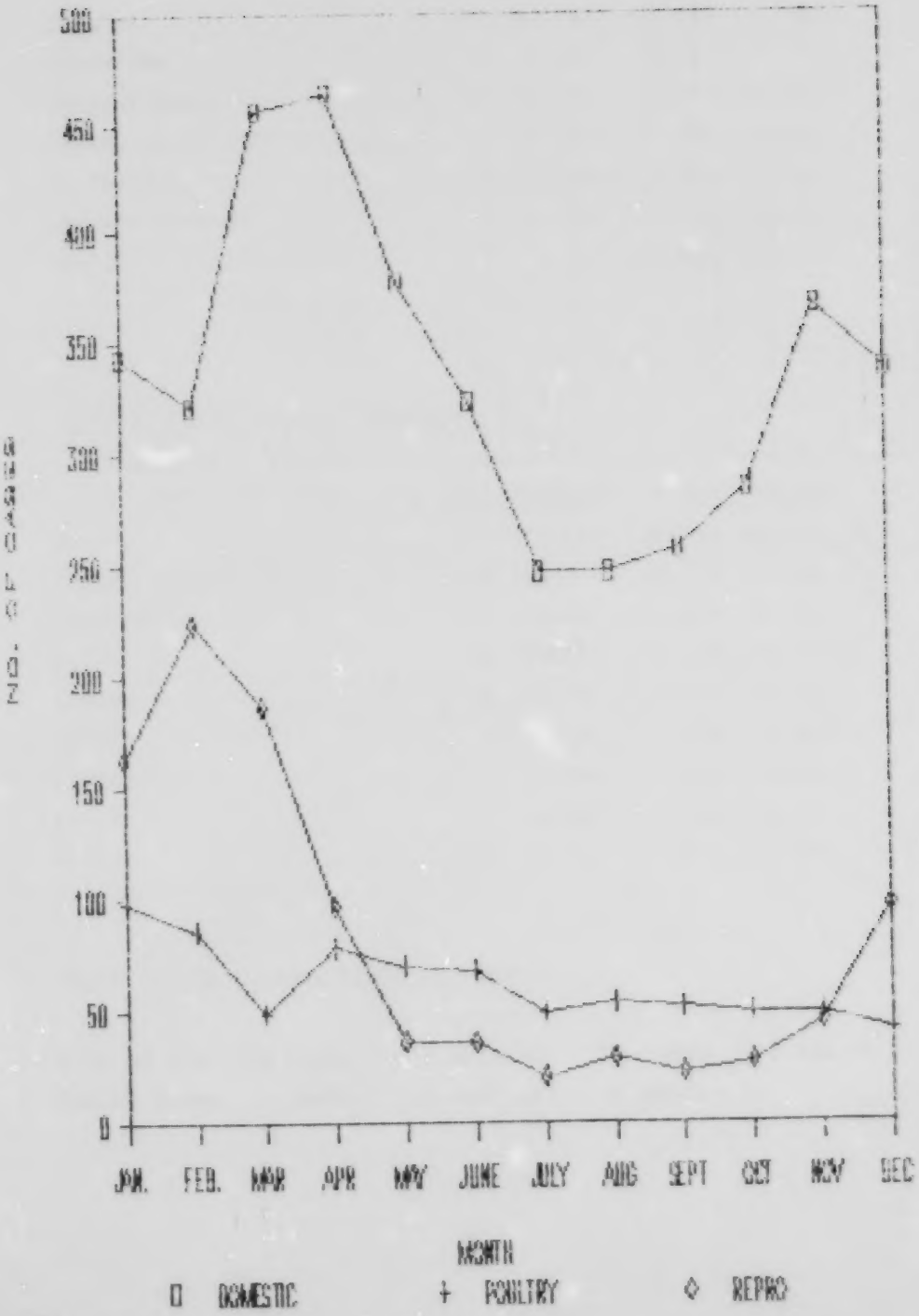

UNIT VALUES & SLIDES
UNIT VALUES (THOUSANDS)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG
SEPT
OCT
NOV
DEC
MONTH
SLIDES
UNIT VALUES

Figure 2

CASES



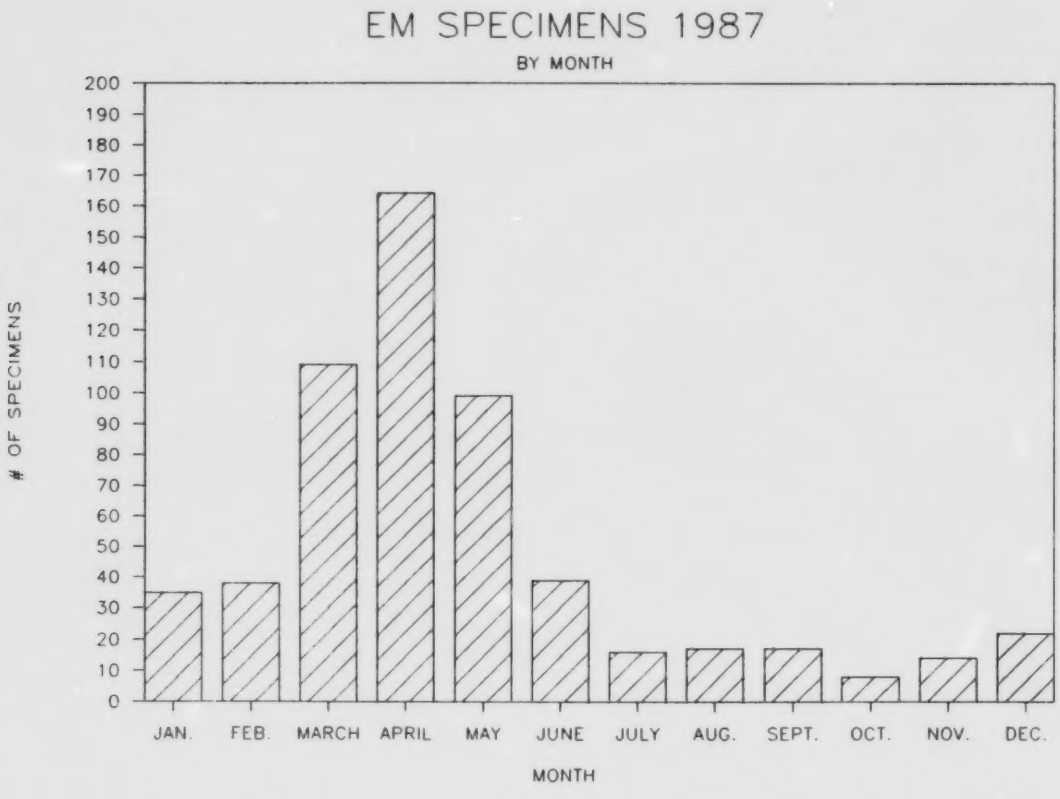

EM SPECIMENS 1987
BY MONTH
OF SPECIMENS
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
JAN.
FEB.
MARCH
APRIL
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
MONTH

Figure 3

TABLE 1. TYPES OF SPECIMENS HANDLED

	# OF SPECIMENS	UNIT VALUES
DIRECTS	481 (82.5%)	42,347 (72.3%)
PARAFFINS	31 (5.3%)	4,727 (8.1%)
CONVENTIONALS	57 (9.8%)	9,573 (16.4%)
TC-FLUIDS	3 (0.5%)	335 (0.6%)
TC-PELLETS	7 (1.2%)	1,482 (2.5%)
SPECIAL SAMPLES	4 (0.7%)	68 (0.1%)
TOTAL	583	58,542

TABLE 2. SPECIMENS BY SPECIES

	# OF SPECIMENS	UNIT VALUES
BOVINE	371 (63.6%)	30,889 (52.8%)
BOVINE (RO/C)	346 (59.3%)	27,227 (47.8%)
PORCINE	111 (19.0%)	15,854 (27.1%)
AVIAN	25 (4.3%)	3,379 (5.9%)
CANINE	19 (3.3%)	1,796 (3.2%)
OVINE	4 (0.1%)	204 (0.4%)
MURINE	3 (0.5%)	419 (0.7%)
FELINE	3 (0.5%)	405 (0.7%)
EQUINE	10 (1.7%)	1,125 (2.0%)

TABLE 3. INDIVIDUAL VIRUS RESULTS

PORCINE TGE	34 CASES	47 ANIMALS	23 CORONA + 2 ROTA + 0 TGE +
CANINE PARVO	13 CASES	14 ANIMALS	3 PARVO +

HEALTH MANAGEMENT BRANCH

The prevention and control of diseases in livestock herds, the administration of animal health programs and protection of human health by control of designated diseases and enforcement of livestock medicine regulations were major responsibilities of the Health Management Branch in 1987. Techniques for disease prevention and improved production to enhance the viability of animal production were emphasized to livestock producers and veterinarians. Private veterinarians were a key link in providing information and services to producers, with over 150 veterinarians participating in the various programs.

Services provided through the branch included the swine herd health program, Alberta certified preconditioned feeder program, community pasture health program, auction inspection program, northern veterinary clinics program, and field assistance provided to veterinarians and animal owners in the diagnosis of unusual disease problems. The transfer of technology was provided both directly, via branch staff, and indirectly through practicing veterinarians.

The Health Management Branch was responsible for the enforcement of various acts and regulations. The provisions of the Livestock Diseases Act, including the Auction

Market Regulation, Designated Diseases Regulation, Assembly Station Regulation, Disposal of Dead Animals Regulation, Sheep Foot Rot Regulation, Livestock Medicine Regulation, the Fur Farms Act and Regulation and the Animal Protection Act were administered by the branch in 1987. Amendments to the regulation of the Fur Farm Act were completed and adopted into legislation. Efforts to revise the Livestock Market Regulations, the Livestock Medicine Regulations and the Animal Protection Act were continued to make them more meaningful and effective.

The ability of the Branch to more comprehensively serve the livestock industry was strengthened by converting the livestock medicine inspector position to one for a beef cattle veterinarian. Dr. Casey Schipper assumed this responsibility and the work formerly done by the livestock medicine inspector is now done by veterinarians in the Epidemiology Section.

Dr. Terry Church was excused from responsibilities as Branch Head while working on the Bovine Respiratory Research Project in early 1987 and then transferred to become Acting Director of the Animal Health Division beginning April 1st. During his absence Drs. Stone and Shute served in the capacity of Acting Branch Head. Dr. Shute was appointed as Acting Branch Head effective May 1, 1987.

Northern Veterinary Clinics

Veterinary service continued from the six government-owned veterinary clinics in Alberta. The clinics at Edson, High Prairie, and Fairview continued to be strong and viable practices. Additional income support was required at Valleyview, Manning, and Fort Vermilion in order to retain practitioners in these areas. A mileage assistance program in I.D. 23 was continued to encourage greater use of the veterinary services. All clinics were leased by veterinary practitioners during the year.

Preconditioning Program

The Alberta Certified Preconditioned Feeder Program designed to enable calves to withstand the stresses of the marketing system enrolled over 24,000 calves in 1987. This represented an increase of 10% over 1986. More producers from the Calgary, Provost and Grande Prairie regions participated in this program.

All time high calf prices recorded in September caused many producers to question potential benefits of preconditioning. However, abundant feed supplies and favourable fall weather resulted in remarkably low cost weight gains of preconditioned calves. This more than compensated the producer for his efforts in spite of somewhat lower prices later in the fall. Most producers realized a substantial net profit from preconditioning

their calves. A study of sales data suggested that all breeds and weight classes of good quality preconditioned calves returned price premiums over regular calves of the same quality. The overall premium paid was $5.53/cwt and $3.87/cwt for steers and heifers respectively. Specific information regarding the program is provided in Table 1.

TABLE 1: Performance of Preconditioned Calves

	1986	1987
Number Producers	284	257
Calves Certified	21,883	24,108
Calves Sold	9,023	10,042
No. of Sales	22	21
Price Premium Overall	4.96	4.97
Price Premium - Steers	4.99	5.53
- Heifers	4.91	3.87
Post Weaning Ave. Daily Gain		
- Steers (lb/day)	1.96	2.07
- Heifers (lb/day)	1.71	1.80
No. Calves monitored	1,434	1,090
Cost (lb/gain)	0.42	0.45
Net Return $/calf	50.00	39.00
Feedlot Health		
No. Calves monitored in Alta.	12,571	2,454
- Morbidity - Precondition %	9.5	6.8
- Regular %	23.0	12.1
- Mortality - Precondition %	0.5	0.4
- Regular %	1.4	0.8

Research Projects

The Bovine Respiratory Disease Project, funded by Farming for the Future, was completed in 1987. The objective of the study was to determine the risk factors which are associated with the development of respiratory disease in feedlot cattle in Alberta. Dr. Susan Wilson completed the data collection and initial analyses.

EPIDEMIOLOGY SECTION

The responsibilities of the Epidemiology Section included the administration of the Designated Communicable Disease Regulation and the Disposal of Dead Animals Regulation, assembling information regarding disease prevalence in food producing animals, participating in and supporting the transfer of information, conducting detailed investigations of unusual disease problems in the field, administration of the Swine Herd Health Program, drug and vaccine trials, and applied research projects. In addition, primary responsibility for the Livestock Medicine Regulation was transferred to this section from the Livestock Inspection Section during the year. Veterinary practitioners continued to carry out the majority of the inspections in the commercial section of the Swine Herd Health Program and several on seedstock herds. Practitioners also participated in local extension activities and, on occasion, conducted disease investigations on our behalf.

Dr. Schipper was appointed to the newly created beef cattle veterinarian position at the end of July, but continued to perform some of the swine veterinarian duties until the end of December when Dr. Garry Finell, who had been practicing in Brooks, was appointed to the position.

Epidemiology and Communicable Diseases

Broad surveillance of disease in food producing animals was maintained by monitoring various laboratory and health management branch reports and by means of computer searches. More detailed information was maintained for diseases of particular interest to the branch, primarily those named in the Designated Communicable Disease Regulation. The following table shows the number of positive diagnoses for each of these diseases for 1987.

Cattle		Swine	
Leptospirosis	1	Leptospirosis	0
Salmonellosis	25	Salmonellosis	4
Sheep		**Poultry**	
Brucella ovis	0	ILT	14
Footrot	17	Salmonellosis	12

In each case, appropriate action was taken to control the outbreak and prevent its spread to other premises and/or humans.

Salmonellosis, due to *Salmonella dublin*, was diagnosed in calves on 7 premises in 1987 and this accounts for the dramatic increase in the number of cases in cattle. All the infected farms had purchased calves

from auction markets or from a dairy which had recently imported dairy cattle from B.C. and Washington state. The number of cases diagnosed in B.C. had also increased considerably over the last two years and it is believed that this disease may have been imported from the U.S. during the recent reduction of the American dairy cattle herd.

The results of the study carried out to determine the accuracy of the ELISA test for swine infected with Actinobacillus (Hemophilus) pleuropneumoniae were submitted for publication.

Information Transfer

The provision of information on animal diseases and management techniques to livestock producers continued to be a very important role of the branch. The Animal Health Division Newsletter continued to be published on a monthly basis and distributed to large animal veterinary practitioners, and livestock specialists within the department.

Presentations were made to groups of producers on 19, and to groups of students or veterinarians on six occasions. Seven presentations related to dairy cattle, seven to swine, and the remainder were directed to beef cattle producers.

The regular column in the Western Hog Journal was maintained and several articles were written for the

Alberta Dairy Producer, Cattlemens Magazine and Country Guide. Other methods of information transfer included fact sheets, a new mastitis management profile, telephone interviews and technical advice during the production of a new film on calving management.

Additions were made to the branch scientific library and a complete review of the current slide kit library was completed.

Disease Investigations

Disease problems on thirty farms were investigated in depth by members of the branch generally at the request of practicing veterinarians. Several of these were, however, on premises on which *Salmonella dublin* infection had been diagnosed and were initiated by the branch. Follow-up was felt to be necessary in these cases to ensure that adequate precautions to control the infection had been taken.

Twenty-four of these investigations involved either beef or dairy cattle. Apart from salmonellosis, nutritional, reproductive, or mastitis problems were the most frequently encountered. Scours, greasy pig disease, and respiratory diseases were problems identified in swine while a variety of problems were responsible for chronic wasting in a flock of ewes.

Swine Herd Health Program

Enrollment in the program remained at the same levels as in 1986. This was primarily due to the fact that approximately the same number of new commercial herds enrolled as the number deleted because of completion of their four year term of participation.

The advisory committee did not meet in 1987. Three meetings of veterinary representatives from the four western provinces resulted in agreement that the criteria for high health would be synchronized across western Canada. There are still problems in finding laboratories which will accept samples from all four provinces and are capable of performing sufficiently accurate serologic tests.

Dr. Schipper was unable to conduct as high a proportion of inspections in the seedstock section as in previous years because of a serious illness. Consequently veterinary practitioners performed a greater number than in the past. Forty-nine practicing veterinarians were contracted by the program in 1987, an increase of 15 over 1986. Enrolled herds contributing swine to three of the major shows and sales in the province were inspected prior to the event and a health certificate issued in each case. In addition, no herd was debarred from the use of test station space because of disease problems.

Submissions of dead pigs to the veterinary laboratories from herds enrolled on the program remained very low in 1987. Although the general health status of many herds remained good, pneumonia caused by Actinobacillus (Hemophilus) pleuropneumoniae and Streptococcus suis type II infection was diagnosed in both commercial and seedstock herds. The most frequent problems in commercial herds were E. coli diarrhea, intestinal accidents, and gastric ulcers. Other diseases included arthritis, pneumonia, intestinal adenomatosis, and pyelonephritis. Clinical evidence of mange and respiratory and enteric diseases continued to be commonly observed in commercial herds and less frequently in seedstock herds.

A new method of evaluating lung lesions based on an estimation of the percentage of the lungs involved was instituted early in the year. This is a much more accurate system of denoting lung involvement and is now widely accepted by the industry. Snout scoring remains unchanged. In addition, head and lung retrieval was improved considerably by twice monthly visits to a Red Deer packing plant where the required specimens are examined on the premise.

Summary of Activities for 1986 and 1987

	1986	1987
Number of seedstock herds	49	54
Number of commercial herds	171	170
Total membership	220	224
Number herds added to program	37	53
Number herds deleted from program	64	49
Number herds visited - HMB staff	68	75
Number herds visited - practitioners	514	439
Number snouts examined for scoring	974	1238
Overall mean snout score (Scale of 0-5)	0.55	0.38
Number lungs examined for scoring	1769	1613
Overall mean lung score (expressed as percentage)	n/a	1.45

Livestock Medicines

Mr. Thompson, who for several years had been employed by the branch as livestock medicine inspector, retired at the end of March. Inspections of licenced outlets was shared by all members of the branch, the main emphasis being placed on those that have the largest volume of sales or a poor record of compliance. Two hundred eighty eight premises were licenced in 1987. Several violations

were disclosed, the most common being illegal advertising, and the sale of outdated or unauthorized products or biologicals.

The livestock medicine advisory committee met in August and carefully reviewed the responses from various interested parties to the proposed changes to the regulations. As a result of this review, a proposal will be forwarded for approval.

LIVESTOCK INSPECTION SECTION

Dr. Ray Fenton became acting head of the Livestock Inspection Section in June, 1987 and the position was temporarily relocated to the Airdrie Regional Diagnostic Laboratory. The position of Field Veterinarian located at Airdrie was temporarily filled by Dr. J. Pritchard. Drs. Fenton and Pritchard familiarized themselves with the Section's regulations and programs, with the assistance of Dr. Shute.

Livestock Market Regulation

Inspection of livestock is conducted at all licenced auction markets in the province by private veterinary practitioners who are appointed as inspectors under the Livestock Diseases Act and are supervised by the Health Management Branch. The purpose of livestock inspection at auction markets is to:

(1) prevent the spread of diseases of livestock through public sales;

(2) increase buyer confidence and, in turn, create better market opportunities for producers;

(3) monitor the construction, repair and sanitation of livestock markets

(4) assist the federal veterinarians in the detection of foreign diseases

Activities of Drs. Fenton and Pritchard centered around orientation of new inspectors, conducting supervisory inspections with established inspectors, communicating with market operators and investigating complaints. Licencing standards for auction markets were studied by evaluating existing conditions at several markets, and some deficiencies were identified.

The livestock inspection program is targeted at detecting infectious diseases. Veterinarians at auction markets examine livestock for diseases of national and local economic significance. Veterinary inspection was provided at 49 livestock auction markets which were licenced for full-time operation and 17 markets which were licenced for occasional sales.

The bouyant livestock economy increased interest in operating livestock markets in 1987. Four previously closed markets (Coronation, Hanna, Stony Plain, Walsh) were re-licenced. A new market facility at Strathmore commenced operations in the fall of 1987.

During 1987, 1,969,473 animals were inspected, which represented a 12% increase from 1986 and the number of sales increased from 3,136 to 3,339. Swine, sheep and cattle accounted for increased numbers, while the numbers of horses and goats decreased in 1987. Cattle accounted for 83.7% of the total animals inspected, swine 14.1%,

sheep 1.1%, and horses and goats together for 1.2%. The average cost of inspection was $0.27 per animal.

The most common causes for cattle being rejected or directed to slaughter at livestock markets were pneumonia, cancer eye, lameness and lumpjaw. For swine, the most common reasons were underweight, mange, rhinitis and arthritis. For sheep, footrot accounted for 92.4% of those rejected or directed to slaughter.

Surveillance was increased early in 1987, to detect salmonellosis in baby calves passing through livestock markets. S. dublin outbreaks had occurred in several calf-rearing operations that purchased these young weaned calves from livestock markets. These calves were typically dairy or dairy crosses, originating locally or from British Columbia. Inspectors were instructed to take rectal temperatures on all weaned calves less than 30 days of age. Later in the year blood culturing of suspect calves for the presence of salmonellae was initiated in order to detect S. dublin.

Application for a project under the Priority Employment Program (PEP) was approved in October. The project was intended to assess auction-source weaned calves for survivability, cause of death, extent of passive immunity transfer, and to aid in determining the source of salmonellae carriers passing through Alberta's livestock markets.

Assembly Stations

A small percentage of the 51 licenced assembly stations were inspected for operational standards and sanitation. The quality and size of these stockyards varied considerably. Most met the requirements of the regulations; the most commonly encountered problems related to deterioration of loading chutes and fences.

Community Pastures

Veterinary inspection of all livestock entering provincial grazing reserves was provided at 43 pasture locations in 1987 by veterinary practitioners employed under this program. These veterinarians also provided health services throughout the grazing season. Inspection of a total of 95,198 cattle and 14,833 sheep was carried out involving a total of 191 entries. The average cost of providing these services was $0.52 per animal.

The Hays Provincial Grazing Reserve (PGR) expanded its sheep grazing capacity to 11,700 head, by virtue of an expanded irrigation system. On-farm flock inspections for new patrons were carried out before entry by veterinary inspectors and pasture supervisors. A detailed set of health standards for sheep entering Hays was prepared by Dr. Fenton for use by entry inspectors. The Medicine Lake PGR maintained its sheep footrot free status.

The Fort Vermilion PGR experienced a severe outbreak

of pneumonia caused by the bovine respiratory syncytial virus (BRSV) in July. The outbreak involved four of the six herds on the pasture, and resulted in 25 deaths and required approximately $20,000 for mass treatment and veterinary services.

Drs. Fenton and Shute attended some meetings of patron associations to advise on health management of animals or specific disease problems. They also conducted educational seminars for pasture supervisors and their assistants.

Sheep Footrot Regulation

Under the authority of the Sheep Footrot Regulation, 20 flocks were quarantined and 11 flocks were removed from quarantine. This quarantine prohibits the sale of sheep for any reason except slaughter, and remains in effect until the disease is shown to be eradicated from the flock.

Contaminated flocks entering Alberta from other areas continued to be a major source of infection. A footrot outbreak occurred on the Tompkins, Saskatchewan grazing reserve, and possible movements of these sheep into Alberta were monitored. Advice on ovine footrot control was extended to provincial sheep technicians, the Alberta Sheep and Wool Commission, and to Saskatchewan regulatory officials.

CATTLE

Reasons for Rejection/Slaughter

	1983		1984		1985		1986		1987	
	No.	%	No.	%	No.	%	No.	%	No.	%
Abscess	143	2.5	107	1.7	106	1.8	77	1.4	107	1.7
Arthritis	87	1.5	126	2.0	119	2.0	89	1.7	131	2.1
Bloat	87	1.5	37	.6	38	.6	27	.5	42	.7
Cancer Eye	1325	23.2	1569	24.9	1371	23.1	1452	27.1	1491	23.4
Cardiac	49	.9	33	.5	28	.5	38	.7	51	.8
Central Nervous Disorders	35	.6	15	.2	12	.2	26	.4	23	.3
Distress	143	2.5	155	2.4	208	3.5	168	3.1	191	3.0
Enteritis	158	2.8	194	3.1	231	3.9	231	4.3	328	5.1
Febrile	508	8.9	549	8.7	52	.9	---	-.-	-.-	-.-
Footrot	124	2.2	65	1.0	194	3.3	74	1.3	70	1.1
Hardware	3	.0	9	.1	3	.1	3	.1	12	.2
Lame	576	10.0	602	9.5	634	10.7	690	13.0	682	10.7
Lice	41	.7	30	.5	8	.1	---	-.-	-.-	-.-
Lumpjaw	536	9.4	584	9.2	491	8.3	416	7.9	421	6.6
Mastitis	136	2.4	147	2.3	166	2.8	189	3.5	185	2.9
Navel Infection	132	2.3	160	2.5	161	2.7	137	2.6	107	1.7
Physical Abnormalities	85	1.5	46	.7	42	.7	20	.4	29	.4
Pinkeye/Eyes	316	5.5	429	6.8	505	8.5	270	5.0	350	5.5
Pneumonia	720	12.7	752	11.9	1008	16.9	811	15.1	1544	24.2
Ringworm	50	.9	182	2.9	119	2.0	158	3.0	78	1.2
Under Age	21	.4	47	.7	37	.6	20		53	.8
Urogenital	223	3.9	228	3.6	202	3.4	239	4.5	224	3.5
Warts	0	.0	0	.0	0	.0	---	-.-	-.-	-.-
Other Diseases	227	4.0	267	4.2	203	3.4	209	4.0	259	4.1
TOTALS	5725	100.0	6333	100.0	5938	100.0	5344	100.0	6378	100.0

* Beginning in 1986, "febrile" cases have been combined with "pneumonia".

SWINE

Reasons for Rejection/Slaughter

	1983		1984		1985		1986		1987	
	No.	%	No.	%	No.	%	No.	%	No.	%
Arthritis	194	3.3	447	5.7	264	5.8	190	6.8	215	6.1
Central Nervous Disorders	---	-.-	11	.1	---	-.-	4	.1	4	.1
Dermatitis	16	.3	67	.9	2	.1	1	-.-	-.-	-.-
Distress	99	1.7	420	5.3	189	4.2	83	3.0	108	3.1
Enteritis	61	1.0	206	2.6	34	.8	40	1.4	76	2.1
Lame	82	1.4	89	1.1	49	1.1	26	.9	155	4.4
Mange	1342	23.1	1839	23.2	1118	24.7	629	22.6	674	19.1
Parasitism	1	.01	23	.3	---	-.-	18	.6	-.-	-.-
Physical Abnormalities	56	1.0	31	.4	111	2.5	74	2.7	122	3.5
Pneumonia	159	2.7	356	4.5	92	2.0	28	1.0	16	.5
Rhinitis	1798	30.9	2016	25.4	1265	28.0	620	22.3	629	17.9
Underweight	1820	31.3	2157	27.2	1202	26.6	1015	36.4	1278	36.3
Other Diseases	187	3.2	258	3.3	193	4.2	60	2.2	243	6.9
TOTALS	5815	100.0	7920	100.0	4519	100.0	2788	100.0	3520	100.0

SHEEP

Reasons for Rejection/Slaughter

	1983		1984		1985		1986		1987	
	No.	%	No.	%	No.	%	No.	%	No.	%
Abscess	21	2.9	1	.1	1	.2	4	1.0	4	.6
Arthritis	0	.0	2	.2	---	-.-	1	.2	-.-	-.-
Brucella Ovis	---	-.-	11	1.4	---	-.-	---	-.-	-.-	-.-
Distress	23	3.2	2	.2	1	.2	49	12.5	8	1.1
Footrot	550	75.7	680	86.5	494	85.9	210	53.6	644	92.4
Lame	11	1.5	28	3.6	---	-.-	24	6.1	2	.3
Mastitis	7	1.0	5	.6	9	1.5	2	.5	17	2.4
ORF	62	8.5	29	3.7	---	-.-	---	-.-	-.-	-.-
Pneumonia	5	.7	15	2.0	13	2.3	66	16.9	7	1.0
Other Diseases	48	6.6	13	1.7	57	9.9	36	9.2	15	2.2
TOTALS	727	100.0	786	100.0	575	100.0	392	100.0	697	100.0

HORSES

Reasons for Rejection/Slaughter

	1983		1984		1985		1986		1987	
	No.	%	No.	%	No.	%	No.	%	No.	%
Influenza	1	2.1	2	3.5	9	16.3	2	6.3	4	2.8
Lame	8	16.6	13	22.8	10	18.2	6	18.7	10	7.1
Pneumonia	20	41.7	16	28.1	4	7.3	-	-.-	5	3.5
Strangles	6	12.5	10	17.5	--	-.-	4	12.5	90	63.4
Other Diseases	13	27.1	16	28.1	32	58.2	20	62.5	33	23.2
TOTALS	48	100.0	57	100.0	55	100.0	32	100.0	142	100.0

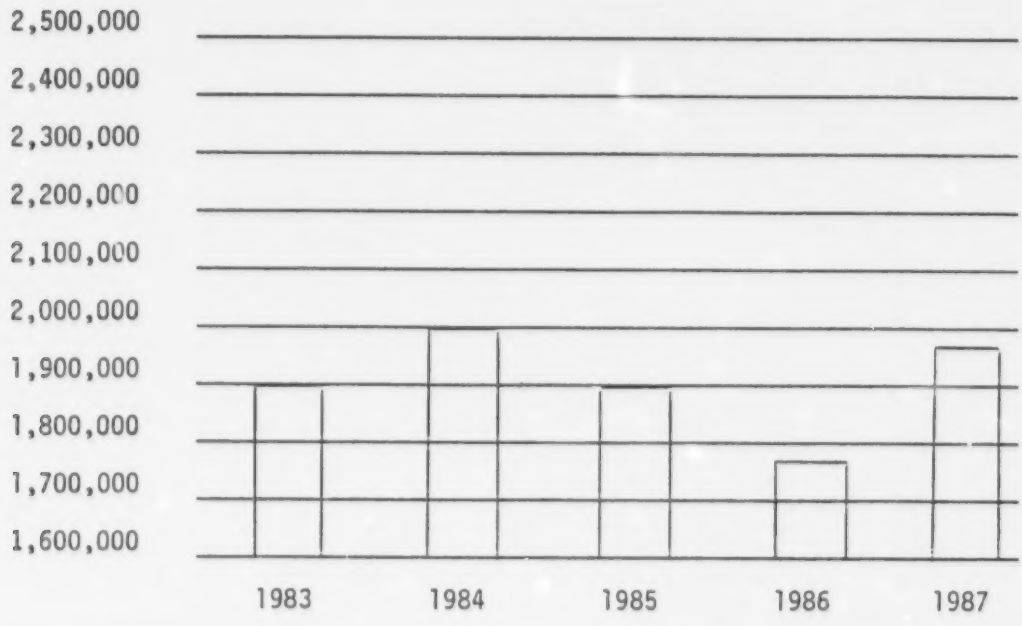
GOATS

Reasons for Rejection/Slaughter

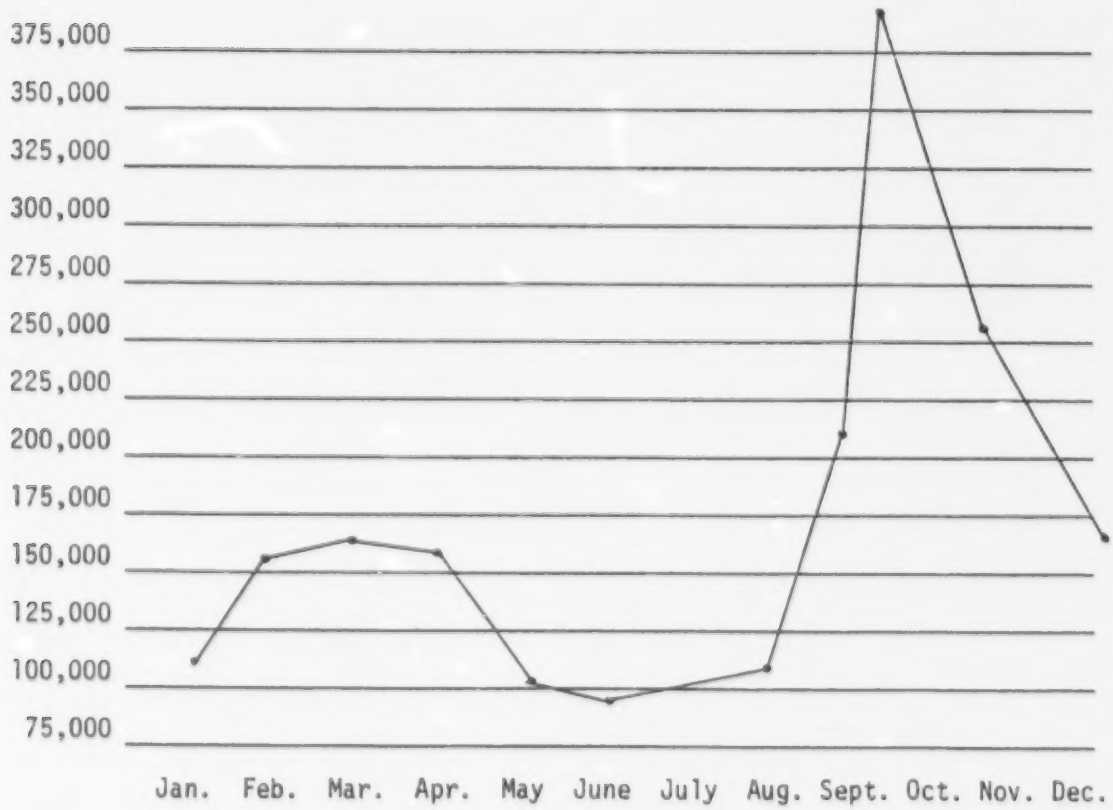
	1983		1984		1985		1986		1987	
	No.	%	No.	%	No.	%	No.	%	No.	%
Lymphadenitis	7	36.8	6	23.1	5	12.2	3	5.8	9	41.0
Mastitis	1	5.3	7	26.9	11	26.8	5	9.6	8	36.4
Pinkeye	--	-.-	--	-.-	1	2.4	-	-.-	-.-	-.-
Pneumonia	5	26.3	2	7.7	1	2.4	3	5.8	2	9.1
Skin Disease	--	-.-	--	-.-	3	7.4	-	-.-	-.-	-.-
Other Diseases	6	31.6	11	42.3	20	48.8	41	78.8	3	13.6
TOTALS	19	100.0	26	100.0	41	100.0	52	100.0	22	100.0

1983 - 1987

TOTAL NUMBER OF LIVESTOCK INSPECTED AT AUCTION MARKETS



NUMBER OF ANIMALS INSPECTED BY MONTH DURING 1987



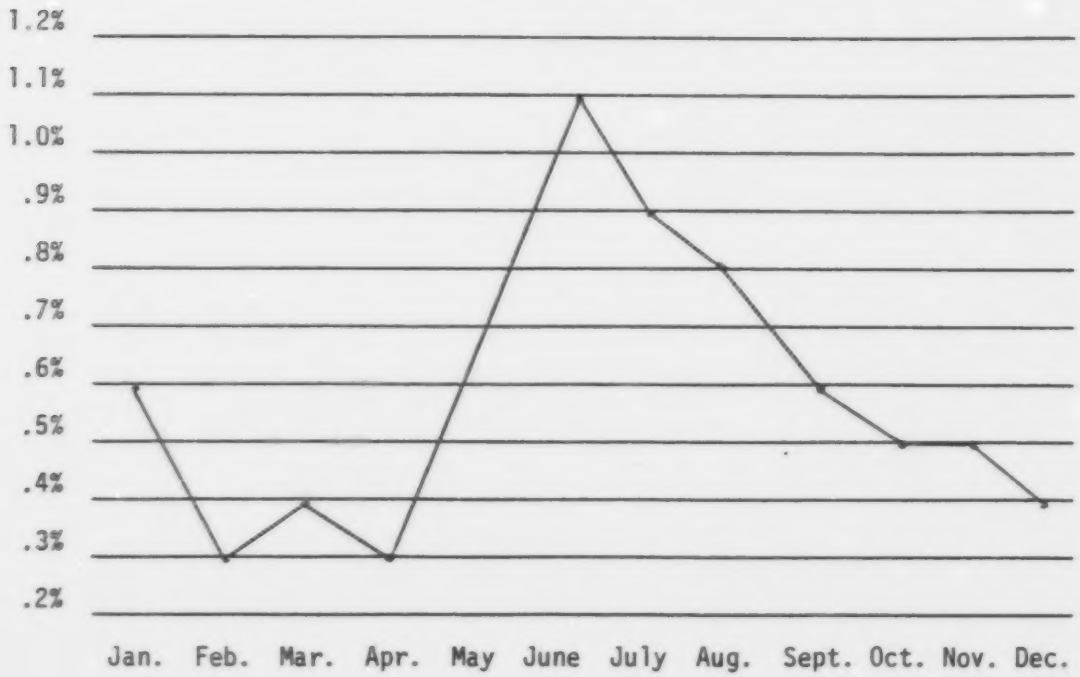
1987

SUMMARY OF RESULTS OF VETERINARY INSPECTION

No. of Auction Markets - 49 No. of Sales 3,339

	Inspected In 1987	Percentage Of 1986	Rejected At Sales		Slaughter Only Animals	
			No.	%	No.	%
Cattle	1,647,835	106.6%	2,743	.2%	3,635	.2%
Swine	277,953	151.5%	3,063	1.1%	557	.2%
Horses	17,352	89.5%	118	.7%	14	.1%
Sheep	21,782	120.6%	86	.4%	599	2.7%
Goats	4,551	93.9%	21	.5%	1	0%
TOTALS	1,969,473	112.1%	6,031	.3%	4,806	.2%

AVERAGE REJECTION RATE FOR ALL ANIMALS INSPECTED - 1987



MEAT HYGIENE BRANCH

The Meat Hygiene Branch is responsible for the administration of the Meat Inspection Act and Regulations including the delivery of the meat inspection service to abattoirs and investigation of alleged violations. The Act is intended to ensure a safe and wholesome meat supply for the citizens of Alberta and to foster expansion of the meat processing industry in rural areas of the province.

During 1987 the Meat Hygiene Branch employed 2 supervisors, 6 regional supervisors, two clerk-typists and 40 inspectors on a full time basis. We also employed 18 inspectors and 136 veterinarians on a part time basis.

Inspection was provided to 76 red meat plants and 92 poultry plants including 83 operated by Hutterite colonies.

Livestock inspected during the year included 36,216 cattle; 107,465 hogs; 5,504 sheep; 973 goats, 7,740 rabbits; and 185 miscellaneous which included 62 buffalo. Poultry slaughter was 2,681,791 broilers; 239,121 fowl; and 138,371 turkeys, ducks, geese and pheasants. Total poultry was 3,059,283. We estimate that 40% of the cattle and 15% of the hogs were custom-slaughtered, but at least half of this amount was subsequently sold by the producer. Negligible amounts of the other species were custom-slaughtered.

Cattle slaughter decreased marginally from the previous year but hog and poultry slaughter showed a marked increase. Other classes of livestock are relatively stable. Carcass condemnations for the year were approximately 1.2% for cattle; .9% for hogs; .36% for sheep; 2.2% for goats, and 2% for poultry.

Enforcement activities continued during the year with approximately 75 possible violations being investigated. Most were found to be in violation, and the bulk of these were persuaded to cease their activities. One licensed abattoir and its owner was convicted of operating without the presence of an inspector, and one unlicensed abattoir was convicted of operating without a licence and selling uninspected meat. Two individuals were charged with selling uninspected turkeys and both these incidents are not yet resolved.

Assistance has been provided to the Alberta Meat Processors Association in development of an apprenticeship program for butchers. This program is badly needed in the province and if efforts are successful a source of properly trained butchers will be available to Alberta's meat packing industry.

At the end of 1987, there were 74 mobile butchers registered, although only approximately 20 were active. Mobile butchers reported slaughter of 1,976 cattle; 191 hogs; 19 sheep; 16 goats, and 1 buffalo. These animals were not inspected and the Regulations require that the meat

from animals slaughtered by mobile butchers shall be consumed on the farm on which the slaughter took place.

SPECIAL INVESTIGATIONS

A. Bovine

1. Investigation into Bovine Lead Toxicity

An investigation of the seasonality and factors associated with lead poisoning in cattle was conducted by Keith Yonge, a veterinary student under the direction of Dr. Byron Morden. This study utilized cases seen in previous years obtained from the diagnostic lab files as well as cases encountered during the summer of 1987. It was observed that lead poisoning occurs most commonly in cattle shortly after a change in pasture. A paper has been prepared from this study and will be submitted for publication in 1988 to the Canadian Veterinary Journal. Out of the study an AGRIFAX paper will also be published titled "Lead Poisoning in Cattle".

2. Fungal Contamination of Bovine Semen

The refusal of processed bovine semen intended for export to the USSR resulting from contamination by fungi initiated an investigation into the source of the problem. The investigation, conducted by Dr. Klavano,

found that environmental fungi were the source of contamination. Redirection of airflow patterns in the semen processing area led to resolution of the problem.

3. Epidermolysis Bullosa-like Disease in Calves

A purebred beef producer had two newborn calves affected with easily tramatized skin in 1986. A similar condition was seen in two calves from the same herd in 1987. Intensive laboratory investigation, including electron microscopic examination, revealed epidermolysis bullosa-like defects in the skin of affected calves. The condition is suspected to be genetically transmitted. Advice was provided to the owner regarding breeding and the herd will be monitored during 1988 for any additional affected calves.

4. Viral Enteritis in Calves Due to BHV-1

An outbreak of neonatal diarrhea with high death losses in neonatal calves was investigated in the Airdrie laboratory. Systemic BHV-1 infection was confirmed in six calves using an Avidin-biotin-peroxidase complex technique on paraffin sections. The producer had been injecting calves at one day of age with a modified live intramuscular

IBR vaccine. Viral fingerprinting is in progress in an attempt to determine whether there is homology between the vaccine strain of BHV-1 and the virus isolated from lesions in affected calves.

5. Iatrogenic IBR Abortion in Cattle

Four beef producers in east central Alberta encountered multiple abortions in their herds. Aborted feti were found to have been lost as a result of IBR virus infection. Further investigation associated the abortions with vaccination of pregnant cows and heifers with a modified live intramuscular IBR vaccine. Vaccination of pregnant cattle with live intramuscular IBR vaccines is a well recognized contraindication. This investigation emphasized the importance of paying attention to contraindications when using biologicals.

B. Poultry

1. Staph aureus Septicemias in Broilers

The Airdrie laboratory encountered continuing problems with Staphylococcus aureus septicemia and osteomyelitis in a large broiler flock. In order to help in the management of this disease, a project involving weekly necropsies was initiated. At the end of each cycle various management procedures were changed for the next cycle and these changes were correlated with changes in mortality patterns. Through this ongoing process the laboratory is assisting the producer and his veterinarian to determine which management factors are precipating or exacerbating the problem.

2. High Mortality in Newly Hatched Chicks due to Pseudomonas infection

At the request of the practitioner and the hatchery, an investigation was performed by Dr. Hanson to explain very high mortality in newly hatched chicks. These chicks were destined for shipment to the Middle East and thus there was considerable impetus to solve the problem before it

potentially jeopardized an important developing overseas market. The very high mortality was found to be due to infection of the vaccination injection site with a pseudomonas organism. Investigations involved examination of two different types of Mareks disease vaccine, bursal disease vaccine, and the diluent. Three different groups of birds had been vaccinated using various combinations of the above agents and mortality had varied from 60% in some groups to 15% in other groups. Laboratory investigations ultimately showed that a new disinfectant used to sterilize the vaccinating equipment was not as efficacious as the previously used product. The new disinfectant was not able to control pseudomonas growth as well as the previous one. The problem was solved when the disinfecting solutions were changed more regularly. Resolution of this problem restored the confidence of the overseas market in the quality of the birds that were shipped.

3. Mycoplasma Associated Production Loss in Laying Flocks

A problem seen in a number of layer and breeder flocks was failure to reach anticipated peak egg production. In other flocks there was a more rapid drop of egg production than expected for the breed of bird. Laboratory

investigations by Drs. Hanson and Onderka implicated Mycoplasma synoviae and Mycoplasma gallisepticum infections in the laying flocks. After discussion with the drug manufacturer, it was determined that the drug Tylosin might be added to the layer rations at levels sufficiently low to avoid contamination of the eggs but still at an efficacious treatment level. Following the flocks through production has shown that the treatment was able to return egg production close to anticipated levels.

4. Feed Trials Involving Turkey Poults

A poultry producer had a number of poults which he felt were not growing sufficiently fast. In response to a complaint regarding this, a number of poults were purchased and placed on test feed and control feed. Feed trials indicated no difference in growth rate in poults fed the control feed or the test feed. The problem was demonstrated not to be associated with the feed. The true cause of the problem was not identified in this situation.

In response to a request from a second producer, a feed trial was conducted to determine if a recurring problem with field rickets might be related to vitamin D_3 levels in the feed. Vitamin D_3 levels in feed are difficult to determine

other than through use of a biological test system. There was no development of rickets in control or feed trial poults indicating that feed apparently was not the primary factor involved in development of field rickets cases on the farm.

Both of these feeding trials were conducted at the Edmonton laboratory by Drs. Hanson and Onderka.

C. Parasitology

1. Seasonal occurrence of Thelazia skrjabini (Nematoda: Spiruroidea) in cattle in central Alberta.

Prevalence and intensity data for eyeworm infections was gathered through necropsies of cattle (primarily beef) submitted to the Provincial Veterinary Laboratory. The study was conducted by Dr. Kennedy and Dave Moraiko. So far, 275 cattle (549 eyes) have been examined. A prevalence of 20% was recorded in beef cattle, and 25% in dairy cattle. The number of worms present ranged from 1-46, with a mean of 6 worms per eye. (1-46).

The study will be continued through 1988.

2. Life cycle transmission of the eyeworm, Thelazia skrjabini.

This study was designed by Dr. Kennedy to examine the development of the eyeworm, T. skrjabini in the intermediate (face flies, Musca autumnalis) and final (Ox) hosts. This is a prelude to study the role of T. skrjabini in conjunctivitis in cattle. We now have a large face fly colony established in the laboratory. We will begin infecting face flies with the larvae of T. skrjabini in January, 1988, and cattle by spring.

3. Seasonal changes of gastrointestinal nematode populations in cattle in central Alberta.

Data on the epidemiology of intestinal nematode infections in cattle was obtained by examining entire intestinal tracts from cattle submitted to the Provincial Veterinary Diagnostic Laboratory. Additional intestinal tracts were obtained through two local packing plants and examined for nematode infections. So far, the intestinal tracts from 161 animals (144 beef and 17 dairy) have been examined. Eleven species of nematodes were identified, and the prevalence, intensity, and seasonal abundance determined for each species. Although the prevalence of infection was

high (85%), the number of worms present is generally low (less than 200 worms). The prevalence and intensity of infection was lowest during the summer months, and highest during autumn and winter months. This cycling in prevalence and intensity of nematode infections must be considered when developing herd management programs.

4. A survey of intestinal nematode infections in cattle of Alberta using fecal analysis.

Fecal samples were analyzed to detect parasite infections in cattle at pasture. Because of the inherent problems in interpreting this type of data, the procedure is used as a general monitoring of parasite burden in cattle. The technique cannot accurately determine the number of worms present. The investigation was conducted on five farms near Red Deer, Alberta. The analysis confirmed the high prevalence of infection (80-100%) in cattle found during our postmortem and packing plant survey. The number of eggs found in the feces remained low (usually <10 epg) for the entire June-September sampling period. Therefore, the procedure did not detect the increase in worm burden from July onward indicated by our survey using intestinal tracts.

This project was conducted by Dr. Kennedy in cooperation with Dale ZoBell, Regional Livestock Specialist, Red Deer, Alberta.

5. Pembina Forage Association Cow/Calf Project-Parasite Survey.

The Pembina Pasture afforded a unique opportunity to study the introduction and establishment of parasites on a pasture not previously grazed by cattle. The survey showed that the infection rate was low (33%) when cattle were first placed on pasture in May. The prevalence increased sharply to 87% in June, and remained high until September, when the cattle were removed from pasture. Although prevalence increased, the number of nematode eggs excreted in the feces remained low and constant (6 epg) during the grazing season.

6. Evaluation of ivermectin on performance of yearling steers on pasture in central Alberta.

The present investigation was conducted to evaluate the efficacy and economic advantage of two treatments (June 1 and July 31) with ivermectin in naturally infected yearling steers on pasture. The results showed that cattle treated

with ivermectin gained significantly more weight over the 120 day trial period. This translated into a net gain of $8.72 per treated animal over control steers.

This project was conducted by Dr. Kennedy in cooperation with Dale ZoBell, Regional Livestock Specialist, Red Deer, Alberta.

7. Evaluation of performance of calves treated twice with ivermectin.

The purpose of this study was to determine the efficacy and economic advantage of using ivermectin in a cow/calf operation. In this study, the calves were treated twice (June 29 and Aug. 3) but their dams were not treated. The trial demonstrated that calves treated with ivermectin gained significantly more weight over this 135 day trial than untreated calves. The weight gain advantage represented an economic gain of $16.26 per treated animal over untreated calves.

8. Comparison of ivermectin, pyrantel pamoate-trichlorfon (Strongid Plus paste), and oxfendazole-trichlorfon (Benzelmin B paste) in suppressing nematode egg excretion in the feces of young horses on pasture during the fall and winter months.

This project began in October, 1987 and will continue until the middle of March, 1988. The three drugs were equally effective in reducing or eliminating ascarid eggs excreted in the feces. Ivermectin and Strongid Plus both eliminated strongyle-type eggs in the feces, but ivermectin suppressed egg secretion longer. Benzelmin B did not reduce egg shedding significantly. We believe that oxfendazole-trichlorfon resistant nematodes have developed on the farm.

D. Other

1. A Study of Ovine Progressive Pneumonia

In the fall of 1987 Dr. Jim Henderson of the Fairview laboratory initiated a study of ovine progressive pneumonia (OPP) in a flock in the Peace River country. Using serologic tests, culling practices and by establishing an OPP clean flock this project is intended to demonstrate

that OPP can be eliminated from a commercial flock. If this study succeeds, the benefits will be directly applicable to other affected flocks in the province. This study is ongoing and it is anticipated to take two to three years.

2. Parasite Survey of Wood Bison

Ken Dies of the Fairview laboratory was invited by the Canadian Wildlife Service to carry out a parasitological examination of specimens collected from Wood Bison in the McKenzie Bison Sanctuary. Samples collected in November 1987 are being examined for helminth parasites, external parasites and eyeworms. This project will be completed in early 1988 and at least one scientific publication is anticipated.

3. Infectious Pancreatic Necrosis in Trout

An outbreak of infectious pancreatic necrosis virus infection in Rainbow trout at the Cold Lake Hatchery was investigated by Dr. Hanson and Bev Larson. There was excessive loss of trout fingerlings in this facility. Disease caused by the IPN virus resulted in very significant

reduction of rainbow trout hatchery stock. The rainbow trout originated from a Calgary Hatchery and intensive monitoring and investigation was performed in an attempt to determine the source of the virus infection. Ultimately it was determined that the IPN virus most likely spread from the indigenous lake trout to the recently introduced rainbow trout.

4. Equine Viral Arteritis Investigation

During January and February 1987 an investigation was conducted by Dr. Klavano into producer concerns of Equine Viral Arteritis (EVA) virus infection in Alberta horses. After the problem was first suspected in several race horses during the summer of 1986, EVA virus was isolated from fetal tissues of one of several abortions which occurred on a single premise. Avenues for submission of serum samples for detection of antibody to EVA virus were established and recommendatons for prevention of infection (particularly in breeding stock) were published.

5. Leptospirosis Investigation in an A.I. Unit

Minitoring of antibody titres to various serovars of Leptospira interrogans in serum of boars in the artificial insemination unit at Leduc continued under Dr. Klavano's supervision. No leptospires have been found on indirect fluorescent antibody test of urine sediment smears. In September 1987 it was decided that boars with antibody titres of <1/100 for serovars pomona and hardjo-bovis would be used to stock the A.I. unit. Antibody titres directed toward four other serovars would simply be monitored for 18 months to 2 years at which time a new protocol of requirements for admission of boars to an A.I. Unit would be established. Currently the A.I. Unit tests urine for leptospires) and serum (for antibody titres) from each boar every month. Boars with leptospiral antibody titres of greater than 1/400 are automatically culled from the unit.

RESEARCH

1. The Effects of Drug Interactions on Nervous Tissue

A Ph.D. thesis studying the effects of a number of drugs used in animal production on nerve function was completed in 1987. This was conducted by Dr. Nation who was on leave from the branch at the University of Calgary. This study demonstrated that the effect that drugs used in animal production have upon nerve cells cannot be predicted based upon the knowledge of the effect that each drug has by itself. Although this study was conducted on isolated nerves, it does have potential implications for food producing animals. A number of papers based upon this research work are being prepared for publication in 1988.

2. Bovine Respiratory Disease Survey

Submissions of bovine respiratory disease to the Airdrie lab for the fall and winter of 1986/87 were reviewed. A total of 523 cases were received, 90% from feedlots. Of these 30% were whole carcasses and the remainder were portions from practitioners. The gross diagnosis was confirmed by histology in 85% of fibrinous pneumonias, 60% of interstitial pneumonias and 40% of other

less common pneumonias. Results were presented to a feedlot industry seminar.

3. Serologic Monitoring of Breeder Flocks for Infectious Bursal Disease

A number of commercial broiler operations experienced excess high mortality due to inclusion body hepatitis. Inclusion body hepatitis is a disease which occurs only in immune incompetent birds. The most common cause of immune incompetency in broilers is a previous infection with the infectious bursal disease agent. Infectious bursal disease should not be a problem in chicks if there is sufficient parental immunity from properly vaccinated breeder flocks. A research project was initiated under Dr. Hanson's supervision in order to determine which hatchery supply breeder flocks had insufficient parental immunity to protect offspring from infectious bursal disease. Monitoring of the flocks suggested there were several flocks kept in production for longer than the usual production cycle. These birds were experiencing low infectious bursal disease titers due to their age and this apparently was the source of the immune deficient chicks.

PROJECTS

1. Computerized List of Recognized Bacterial Species

The necessity of maintaining an up-to-date list of officially recognized bacterial species of particular interest in the field of veterinary microbiology was recognized. Ken Manninen of the Fairview laboratory has undertaken to compile such a list. The list to date includes 1,014 entries and has been entered into an IBM personal computer. This will be an ongoing project intended for the use of all our laboratories and other interested institutions.

LIST OF PUBLICATIONS AND ARTICLES

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2. Kennedy, M.J. 1987. Pembina Forage Association cow/calf project: Intestinal parasite survey. The Hayshaker 11: 10-12.

3. Schoonderwoerd, M. Calf milk replacers. Proc of 19th Annual Dairy Producers Short Course, Abbotsford, B.C. Page 99. 1987.

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TABLE I
IMPORTANT DISEASES OF CATTLE

DISEASE	LETHBRIDGE	AIRDRIE	EDMONTON	FAIRVIEW	TOTALS
REPRODUCTIVE DISEASE					
ABORTION VIRAL:					
IBR	2	16	43	0	61
BVD	0	0	24	2	26
OTHER	1	4	39	2	46
UNDETERMINED ETIOLOGY	1	4	40	2	47
BACTERIAL:					
CAMPYLOBACTER	3	0	5	0	8
LISTERIA	0	3	12	0	15
BACILLUS	2	0	4	0	6
OTHER	36	73	131	23	263
UNDETERMINED ETIOLOGY	22	58	86	20	186
NUTRITIONAL	2	2	5	0	9
CONGENITAL DEFECTS	33	68	155	19	275
DYSTOCIA	6	20	33	8	67
INFERTILITY	0	0	0	0	0
RESPIRATORY DISEASE					
BOVINE RESPIRATORY SYNCYTIAL VIRUS	0	0	3	2	5
PARASITIC PNEUMONIA	0	0	4	0	4
PASTEURELLA HEMOLYTICA	83	60	180	37	360
INFECTIOUS BOVINE RHINOTRACHEITIS	59	107	189	34	389
GASTROINTESTINAL DISEASE					
ABOMASAL ULCER	2	19	20	2	43
BLOAT	26	47	47	22	142
BOVINE VIRUS DIARRHEA	20	25	49	11	105
BRAXY	3	0	2	0	5
CAMPYLOBACTERIOSIS	1	0	1	0	2
COCCIDIOSIS	3	10	14	4	31
GASTROENTERIC PARASITISM	0	0	1	0	1
NEONATAL ENTERITIS:					
ENTERIC COLIBACILLOSIS	1	0	21	3	25
VIRAL ENTERITIS	11	4	42	3	60
CRYPTOSPORIDIOSIS	1	0	4	0	5
PARATUBERCULOSIS	4	4	7	3	18
RUMINAL ACIDOSIS	0	3	4	2	9
SALMONELLOSIS:					
S. DUBLIN	0	0	0	0	0
S. TYPHIMURIUM	0	1	7	0	8

TABLE I
IMPORTANT DISEASES OF CATTLE

DISEASE	LETHBRIDGE	AIRDRIE	EDMONTON	FAIRVIEW	TOTALS
NERVOUS DISEASE					
CEREBELLAR HYPOPLASIA	1	1	2	2	6
ITEME	0	0	0	0	0
LISTERIOSIS	0	0	1	0	1
POLIOENCEPHALOMALACIA	12	9	5	2	28
MUSCULOSKELETAL DISEASE					
BLACKLEG	2	9	29	3	43
DOWNER COW SYNDROME	0	0	1	0	1
NUTRITIONAL MYOPATHY	1	18	73	3	95
OTHER					
ACARIASIS	1	1	0	0	2
ACTINOMYCOSIS	1	0	0	1	2
ANAPHYLAXIS	0	0	0	0	0
ANTHRAX	0	0	0	0	0
LEPTOSPIROSIS	1	0	0	0	1
MALIGNANT CATARRHAL FEVER	1	3	6	0	10
MALIGNANT EDEMA	1	3	6	0	10
MASTITIS	77	5	221	7	310
TOXICOSIS:					
LEAD	1	6	12	3	22
PESTICIDES	0	0	2	0	2
OTHER	1	6	6	1	14

TABLE II
IMPORTANT DISEASES OF SHEEP AND GOATS

DISEASE	LETHBRIDGE	AIRDRIE	EDMONTON	FAIRVIEW	TOTALS
REPRODUCTIVE DISEASE					
ABORTION ENZOOTIC	7	0	1	1	9
BACTERIAL:					
BRUCELLA OVIS	0	0	0	0	0
CAMPYLOBACTER	4	0	1	0	5
LISTERIA	0	0	0	0	0
OTHER	2	4	6	0	12
UNDETERMINED	0	4	5	0	9
MYCOTIC	0	0	0	0	0
TOXOPLASMA	0	0	0	0	0
CONGENITAL DEFECTS	6	5	10	0	21
INFERTILITY	0	0	0	0	0
RESPIRATORY DISEASE					
NASAL ADENOMATOSIS	0	0	0	0	0
OVINE PROGRESSIVE PNEUMONIA	0	0	0	4	4
PASTEURELLA PNEUMONIA	4	2	16	9	31
PULMONARY ADENOMATOSIS OF SHEEP	0	0	0	0	0
VERMINOUS PNEUMONIA	0	1	2	1	4
GASTROINTESTINAL DISEASE					
BRAXY	0	1	1	0	2
COCCIDIOSIS	6	4	3	4	17
ENTEROTOXEMIA	3	0	2	1	6
GASTROINTESTINAL PARASITISM	0	0	5	0	5
NEONATAL DIARRHEA	1	2	0	0	3
OSTERTAGIASIS	0	0	0	0	0
PARATUBERCULOSIS	1	1	4	4	10
RUMINAL ACIDOSIS	1	6	2	4	13
SALMONELLOSIS	0	0	0	0	0
NERVOUS DISEASE					
CAPRINE ARTHRITIS AND ENCEPHALITIS	0	0	0	0	0
LISTERIOSIS	0	2	1	0	3
POLIOENCEPHALOMALACIA	6	3	3	0	12

TABLE II
IMPORTANT DISEASES OF SHEEP AND GOATS

DISEASE	LETHBRIDGE	AIRDRIE	EDMONTON	FAIRVIEW	TOTALS
NUTRITIONAL DISEASE					
COPPER DEFICIENCY	0	0	0	0	0
COPPER TOXICOSIS	2	1	2	1	6
MALNUTRITION	0	9	8	4	21
NUTRITIONAL MYOPATHY	1	0	2	2	5
OTHER					
ACARIASIS	0	0	0	0	0
ANTHRAX	0	0	0	0	0
CASEOUS LYMPHADENITIS	3	1	7	1	12
CONTAGIOUS ECTHYMA	0	1	2	1	4
ECHINOCOCCOSIS	0	0	0	0	0
FOOTROT	2	4	12	0	18
HYPOTHERMIA	0	0	1	0	1
LEPTOSPIROSIS	0	0	0	0	0

TABLE III
IMPORTANT DISEASES OF SWINE

DISEASE	LETHBRIDGE	AIRDRIE	EDMONTON	FAIRVIEW	TOTALS
REPRODUCTIVE DISEASE					
ABORTION: VIRAL:					
PARVOVIRUS	0	0	1	0	1
OTHER	0	1	1	0	2
UNDETERMINED ETIOLOGY	0	1	1	0	2
BACTERIAL AND MYCOTIC	3	4	12	2	21
CONGENITAL DEFECTS	6	2	25	1	34
LEPTOSPIROSIS	0	0	0	0	0
MASTITIS METRITIS AGALACTIA SYNDROME	0	1	0	0	1
RESPIRATORY DISEASE					
ATROPHIC RHINITIS	0	1	4	4	9
BACTERIAL PNEUMONIA:					
PASTEURELLA MULTOCIDA	20	8	53	11	92
STREPTOCOCCUS SUIS	8	1	14	5	28
HEMOPHILUS PARASUIS	0	0	0	0	0
ACTINOBACILLUS PLEUROPNEUMO	20	1	18	3	42
MYCOPLASMA	0	0	4	0	4
PLEURITIS	8	4	9	4	25
SWINE INFLUENZA	0	0	0	0	0
GASTROINTESTINAL DISEASE					
COCCIDIOSIS	2	1	0	0	3
EDEMA DISEASE	1	1	1	2	5
GASTRIC DILATATION AND TORSION SYNDROME	18	13	19	2	52
GASTRIC ULCER	13	8	14	2	37
INTESTINAL ADENOMATOSIS SYNDROME	11	9	14	1	35
ENTERIC COLIBACILLOSIS	28	5	67	20	120
NECROTIC ENTERITIS	1	2	9	0	12
PARASITIC ENTERITIS	1	1	0	0	2
SWINE DYSENTRY	10	4	23	1	38
TRANSMISSIBLE GASTROENTERITIS	0	0	0	0	0
OTHER					
ACARIASIS	0	0	0	0	0
DEGENERATIVE ARTHRITIS	0	0	0	0	0

TABLE III
IMPORTANT DISEASES OF SWINE

DISEASE	LETHBRIDGE	AIRDRIE	EDMONTON	FAIRVIEW	TOTALS
EXUDATIVE EPIDERMITIS	8	9	14	0	31
ERYSIPELAS	0	1	7	1	9
MALIGNANT HYPERTHERMIA	0	0	0	0	0
NUTRITIONAL CARDIOMYOPATHY	4	9	20	5	38
POLYSEROSITIS	0	5	6	0	11
PYELONEPHRITIS AND CYSTITIS	5	2	1	1	9
STREPTOCOCCAL POLYARTHRITIS	1	0	1	1	3
STREPTOCOCCUS SUIS II SEPTICEMIA	3	7	12	1	23

TABLE V
IMPORTANT DISEASES OF HORSES

DISEASE	LETHBRIDGE	AIRDRIE	EDMONTON	FAIRVIEW	TOTALS
REPRODUCTIVE DISEASE					
ABORTION: VIRAL:					
EVR	0	1	2	0	3
EVA	0	0	0	0	0
OTHER	0	4	4	0	8
UNDETERMINED ETIOLOGY	0	1	0	0	1
MYCOTIC	0	0	0	0	0
BACTERIAL	1	8	2	0	11
TWINNING	3	1	0	0	4
CONGENITAL DEFECTS	0	5	11	2	18
GASTROINTESTINAL DISEASE					
COLITIS	3	6	5	1	15
GASTRIC DILATATION/TORISON/RUPTURE	0	0	1	0	1
PARASITIC GASTROENTERITIS	0	0	2	0	2
OTHER					
ALSIKE CLOVER POISONING	0	0	1	2	3
COMBINED IMMUNODEFICIENCY	0	0	0	0	0
EQUINE INFECTIOUS ANEMIA	0	0	0	0	0
GOITRE	1	2	2	0	5
HYPOTHERMIA	0	0	0	0	0
LEPTOSPIROSIS	0	0	0	0	0
STRANGLES	0	0	3	0	3
WESTERN EQUINE ENCEPHALOMYELITIS	0	0	0	0	0

TABLE IV
IMPORTANT DISEASES OF POULTRY

DISEASE	LETHBRIDGE	AIRDRIE	EDMONTON	FAIRVIEW	TOTALS
RESPIRATORY DISEASE					
AIR SACCULITIS	8	9	7	3	27
BRONCHITIS INFECTIOUS	2	1	1	0	4
CHLAMYDIOSIS	0	0	0	0	0
FOWL CHOLERA	0	2	6	2	10
INFECTIOUS LARYNGOTRACHETIS	3	5	7	0	15
INFLUENZA	0	0	0	0	0
NEWCASTLE DISEASE	0	0	0	0	0
SINUSITIS	1	3	4	2	10
GASTROINTESTINAL DISEASE					
COCCIDIOSIS	2	7	37	13	59
COLIGRANULOMA	0	0	0	0	0
FATTY LIVER SYNDROME	4	8	16	1	29
HISTOMONIASIS	2	1	17	9	29
MALABSORPTION SYNDROME	4	3	12	25	44
NECROTIC ENTERITIS	6	4	56	3	69
TRANSMISSIBLE ENTERITIS	0	0	4	0	4
NERVOUS DISEASE					
ENCEPHALOMALACIA	0	0	0	0	0
AVIAN ENCEPHALOMYELITIS	0	0	3	0	3
MUSCULOSKELETAL DISEASE					
ARTHRITIS:					
STAPHYLOCOCCUS AUREUS	1	10	73	1	85
RICKETS	4	0	30	10	44
VALGUS LEG DEFORMITY/ VARUS LEG DEFORMITY	10	14	101	10	135
OTHER					
ACUTE DEATH SYNDROME/CARDIAC FAILURE	9	26	197	11	243
ANEURYSM	0	0	5	0	5
ASCITES/ROUND HEART DISEASE	19	31	171	18	239
EGG PRODUCTION LOSS	0	0	5	0	5
ERYSIPELAS	0	1	0	0	1
HYPOTHERMIA	1	0	1	0	2
INCLUSION BODY HEPATITIS	1	2	17	2	22
INFECTIOUS BURSAL DISEASE	2	0	25	0	27
MAREK'S DISEASE	5	8	10	12	35
POX AVIAN	0	0	0	0	0
SALMONELLOSIS	3	10	13	0	26
STARVE OUT/DEHYDRATION	3	14	99	4	120

RABIES SUMMARY

1987

SPECIES	LOCATION	NUMBER POSITIVE	DATE CONFIRMED
Cat	Vegreville	1	January 23
Skunk	19-10-2-W4	1	January 28
Skunk	NW20-9-2-W4	1	January 28
Skunk	NE25-10-2-W4	1	January 28
Skunk	Etzikon	1	January 28
Skunk	SE5-10-3-W4	1	February 4
Skunk	SE5-10-3-W4	1	February 4
Skunk	SE29-10-3-W4	1	February 4
Skunk	SE18-9-3-W4	1	February 4
Skunk	SE17-7-8-W4	1	February 6
Skunk	SE8-7-8-W4	1	February 6
Skunk	SE4-10-3-W4	1	February 13
Skunk	SE4-10-3-W4	1	February 13
Skunk	SE10-51-16-W4	1	February 16
Skunk	SE2-7-8-W4	1	February 24
Skunk	SE29-10-3-W4	1	March 9
Skunk	NW17-10-7-W4	1	March 9
Skunk	SW3-19-14-W4	1	March 9
Skunk	NE18-19-13-W4	1	March 9
Skunk	SE26-8-3-W4	1	March 12

Skunk	SW28-9-2-W4	1	March 12
Skunk	Irvine	1	March 26
Skunk	Elkwater	1	March 26
Skunk	Schuler	1	March 26
Skunk	Walsh	1	March 26
Skunk	SE12-17-1-W4	1	April 8
Skunk	NW14-2-6-W4	1	April 16
Bat	NW17-21-18-W4	1	May 11
Cat	Edmonton	1	May 25
Bovine	SE22-13-3-W4	1	May 25
Skunk	NE24-2-6-W4	1	June 3
Bat	Lethbridge	1	June 10
Bovine	NW8-13-3-W4	1	July 10
Skunk	SE10-19-10-3-W4	1	July 16
Bat	Elk Point	1	August 11
Bat	Provost	1	August 14
Bat	Gwynne	1	August 13
Bat	NE3-40-4-W5	1	September 8
Bat	Bassano	1	September 2
Skunk	NE26-2-14-W4	1	November 23
Skunk	SE35-2-14-W4	1	November 30
Skunk	SE35-2-14-W4	1	December 2
Skunk	SE29-10-3-W4	1	December 29
Skunk	SW22-10-2-W4	1	December 29

TOTALS	BATS	7
	BOVINE	2
	FELINE	2
	SKUNKS	33
		44

Salmonella species isolated in Alberta from specimens submitted to the Veterinary Diagnostic Laboratories, 1987.*

Salmonella species	Bovine	Canine	Equine	Feline	Ovine	Porcine	Poultry	Reptile	Other	TOTAL
S. agona							3			3
S. albany	1									1
S. anatum	2								1	3
S. arizonae					1		7	1	1	10
S. california	1					1				2
S. cubana									1	1
S. derby				1						1
S. dry pool									1	1
S. dublin	20									20**
S. enteriditis	1									1
S. haardt	1									1
S. hadar	1						2		2	5
S. heidelberg							8			8
S. livingstone							1			1
S. newbrunswick	3		1							4
S. newport							1			1
S. nienstedten	1									1
S. ohio							1			1
S. rubislaw	1					1				2
S. schwarzengrund	2									2
S. subgenis I			2							2
S. thompson	1									1
S. typhimurium	31		2			2	8		1	44
S. untyped	17	2	1			5	25	4	3	57
TOTAL	83	2	6	1	1	9	56	5	10	173

* Data obtained from Airdrie, Edmonton, Fairview and Lethbridge Veterinary Laboratories.

** Isolated from 7 premises.